SONY

PORTABLE VIDEOCORDER
TRAGBARER VIDEO-RECORDER
MAGNETOSCOPE VIDEO PORTATIF

BVH-500PS

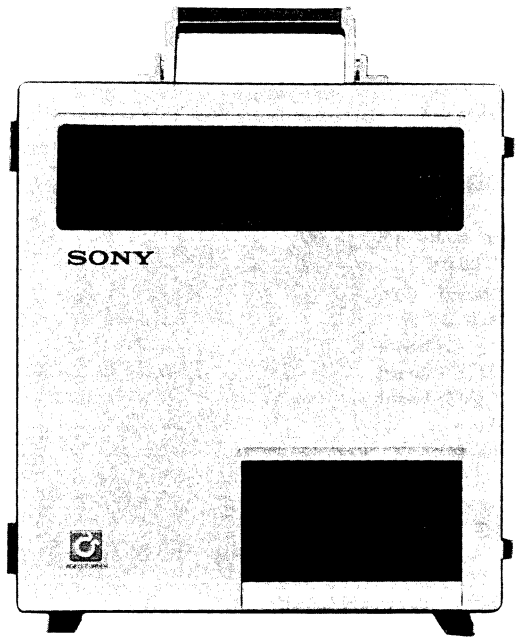
OPERATION AND MAINTENANCE MANUAL
BEDIENUNGS- UND WARTUNGSANLEITUNG
MODE D'EMPLOI ET D'ENTRETIEN

1st Edition
Serial No. 10001 to 10100

SONY

PORTABLE VIDEOCORDER

BVH-500PS



OPERATION AND MAINTENANCE MANUAL

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SECTION 1
OPERATION

1-1. FEATURES

EBU Type C Format

The BVH-500PS is a 1-inch PAL/SECAM high-band FM direct recording portable videocorder specifically designed as a sister version of Sony's BVH-1100PS broadcast VTR. Not only is there complete tape compatibility with the BVH-1100PS, but the same EBU type format (EBU type C) is employed.

Compact size and light weight

The stack reel system designed to enhance the space factor, the aluminum die-cast chassis, the monocoque-constructed exterior and the head drum which is directly coupled to the flat motor all combine to make a compact and overall light weight unit.

Auto back space editing (selectable)

The Auto backspace feature permits assembly editing with smooth scene-to-scene transitions. The mechanism action is as follows: rewind a few seconds after recording ⟶Stop (standby)⟶REC trigger ⟶Playback⟶Servo lock⟶Record. These sections are performed automatically.

Digital servo system

A digital servo circuit is employed which allows a high-resolution servo loop to be incorporated during recording/playback.
This circuit eliminates instability caused by high transient amplitude errors, often a problem with digital control systems, and it also quantizes in special non-linear form the error detection to effectively minimize the effects of gyroscopic error, environmental changes, and long term drift.

Electronic tension servo system

The special phase circuit performs two important functions: it accurately detects the reel rotational speed and applies a back torque to the reel supply motor which is proportional to the reel diameter, thus eliminating the fluctuations in the static tension; it also feeds back the resulting high-speed fluctuation in reverse phase making it possible to achieve a highly precise degree of tension stability.

Anti-rolling characteristics

The special tension servo enhances the anti-rolling characteristics.

Alarm systems

Battery alarm: When the voltage level of the internal battery drops below a usable level determined by the battery discharge curve, the warning lamp flashes and finally remains on indicating a low level.

Head clog alarm & servo alarm: During recording or servo lock, a stationary video head monitors the recorded sync tip signal and triggers alarm signals in case of head clogging, servo unlocking, or other recording imperfections. (Servo/record alarm)

Overmodulation alarm: This monitors the video peak level and provides a warning when this value reaches a critical level. (excess video alarm)

Protection circuits

Tape-Before-End detector circuit: This circuit detects the amount of tape remaining on the supply reel. The tape is stopped when the tape remaining reaches a certain amount. This circuit functions in both the fast forward and record/playback modes.

Drum rotation detector circuit: This circuit is actuated when condensation forms and the rotation of the drum is stopped. (This safeguards against wasting power.)

Irregular tape motion detector circuit: This sets the recorder to the stop mode when the tape movement fails to return to the rated speed within a fixed period of time because of creases or other damage to the tape.

Built-in EBU time code generator

The EBU time code can be recorded simultaneously on audio CH-3 during recording. Using the internal selector switch, the time code may be set to REC-RUN or FREE-RUN.

Recording current adjustment

The optimum recording current may be set easily and speedily.

Low power consumption

C-MOS integrated circuits in the logic control circuitry, high-efficiency switching regulators, stand-by-mode current reduction together with the high-efficiency coreless motor combine to reduce power consumption to the absolute minimum.

Long recording time

Up to sixty minutes of non-stop recording without changing over the tapes is possible with a single reel of Sony V-16 high-density tape (9-inch reel).

Other important features include

Self-lighting logic control buttons for positive control identification; a liquid crystal digital display for low power consumption; playback output connectors for B/W monitoring; and a dust-proof, water-proof housing for reliable operation even under extreme field conditions. All these features heighten the ease of operation, portability and over-all reliability of this quality broadcast videocorder.

1-2. SPECIFICATIONS

Power requirement	DC 12 V
Power consumption	56 W
Operating temperature	0°C to 40°C
Humidity	10% to 90% (non-condensing)
Dimensions	Refer to the "FIXED USE"
Weight	Approx. 22 kg (including batteries, tape, reels)
Recording system	High-band FM direct
Tape speed	23.98 cm/sec
Writing speed (relative speed)	21.39 m/sec
Recording/playback time	63 min. (with 9-inch reel)
REW time	Approx. 4.5 min. (with 9-inch reel)
Lock-up time	Less than 3.5 sec. (stand-by mode)
Operating position	Horizontal or vertical
Recommended tapes	Sony 1-inch high-density tape (V-16 series) or equivalent
Reel size	8", 9", 9.25", 9.5"
Tape timer	99 min., 59 sec.
Battery capacity	90 min. (using two Sony BP-90 fully charged battery packs)

Video

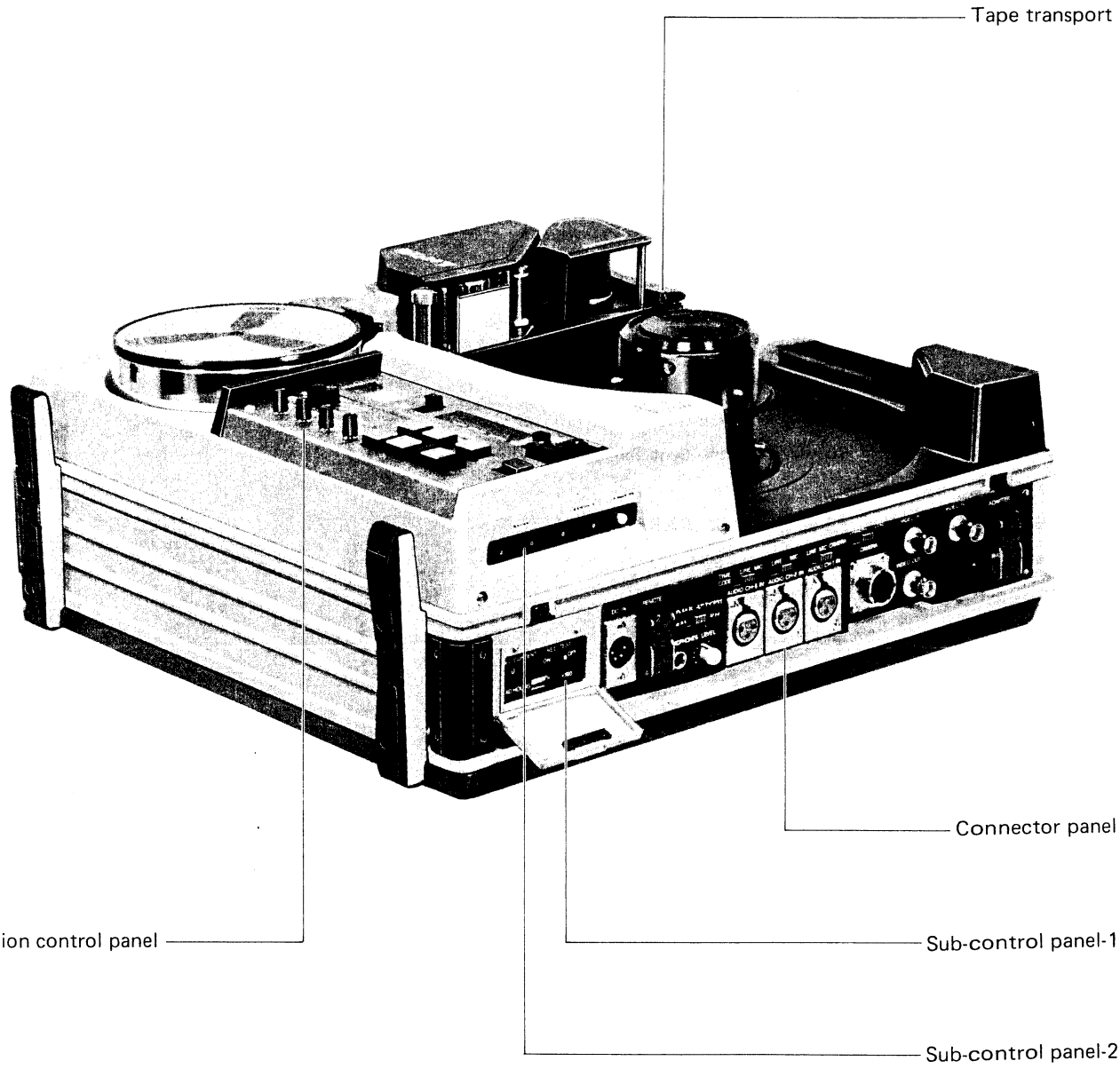
Bandwidth	5.5 MHz ±0.5 dB, 6 MHz −3 dB	Playback on BVH-1100PS
Signal-to-noise ratio	Better than 43 dB	
Differential gain	Less than 4%	
Differential phase	Less than 4°	
Transient response	Less than 1% (2T pulse)	
Moire	Less than −35 dB (75% colour bar)	
Chrominance delay	Less than 25 n sec.	
Input	1.0 Vp-p, 75 ohms	
Monitor output	1.0 Vp-p, 75 ohms (colour unstabilized)	
CF pulse input	6.25 Hz, 50% duty TTL (for colour framing servo)	

Audio

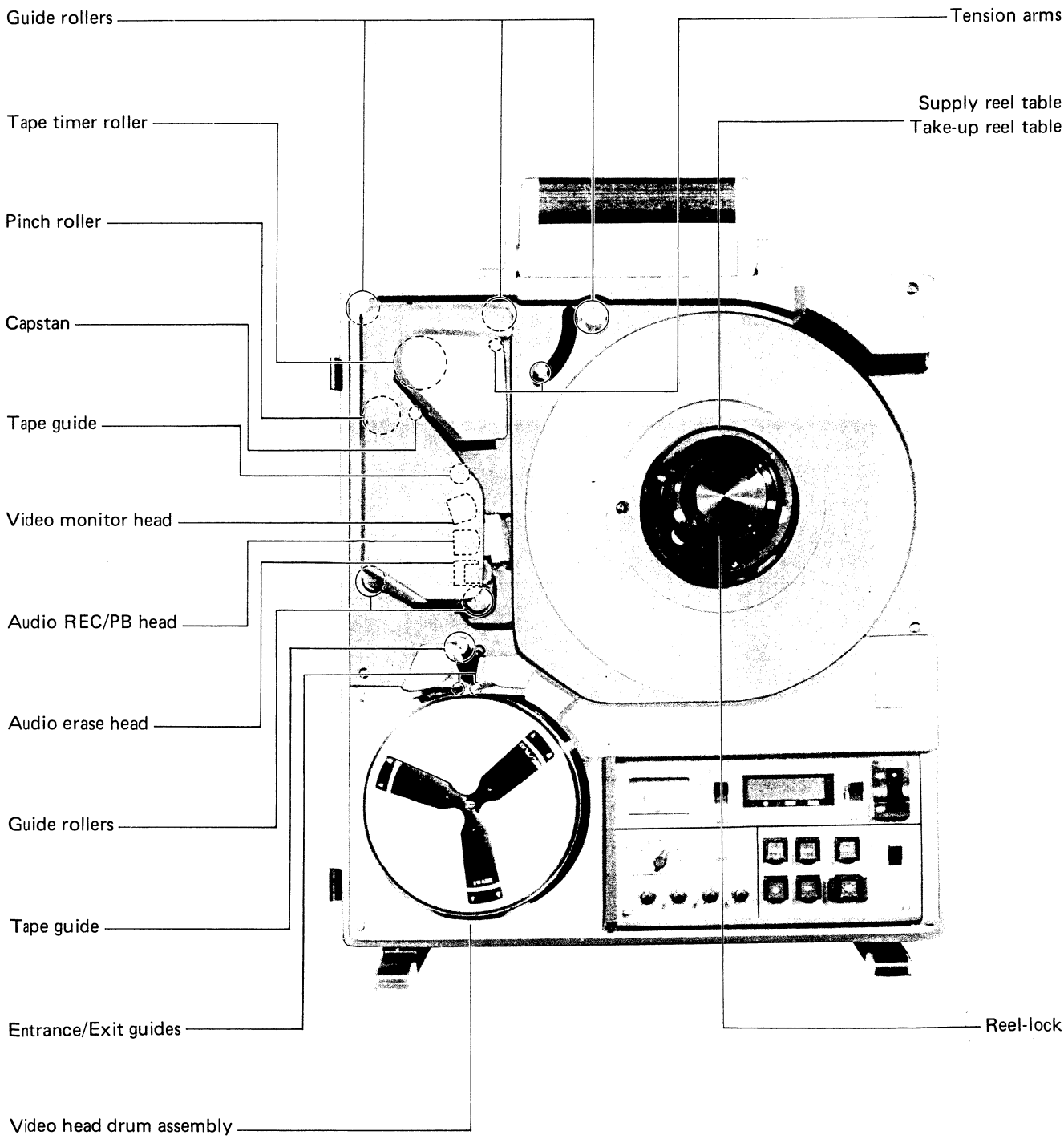
Frequency response	50 to 15,000Hz $^{+1}_{-3.5}$ dB (CH-1/2/3)	Playback on BVH-1100PS
Signal-to-noise ratio	Better than 56 dB (CH-1/2) (at 3% distortion level) Better than 50 dB (CH-3) (at 3% distortion level)	
Distortion	Less than 1.2% (at operating level)	
Crosstalk	Less than −60 dB (at 1 kHz)	
Wow and flutter	Less than 0.12% rms	
Input	Line: 27 to −22 dBm, 600 ohms, balanced Mic: −60 dBm, 600 ohms, balanced (−72 to −20 dBs)	
Headphone output	−30 to −13 dB (adjustable)	

Accessories Empty reel
Camera replacement cable

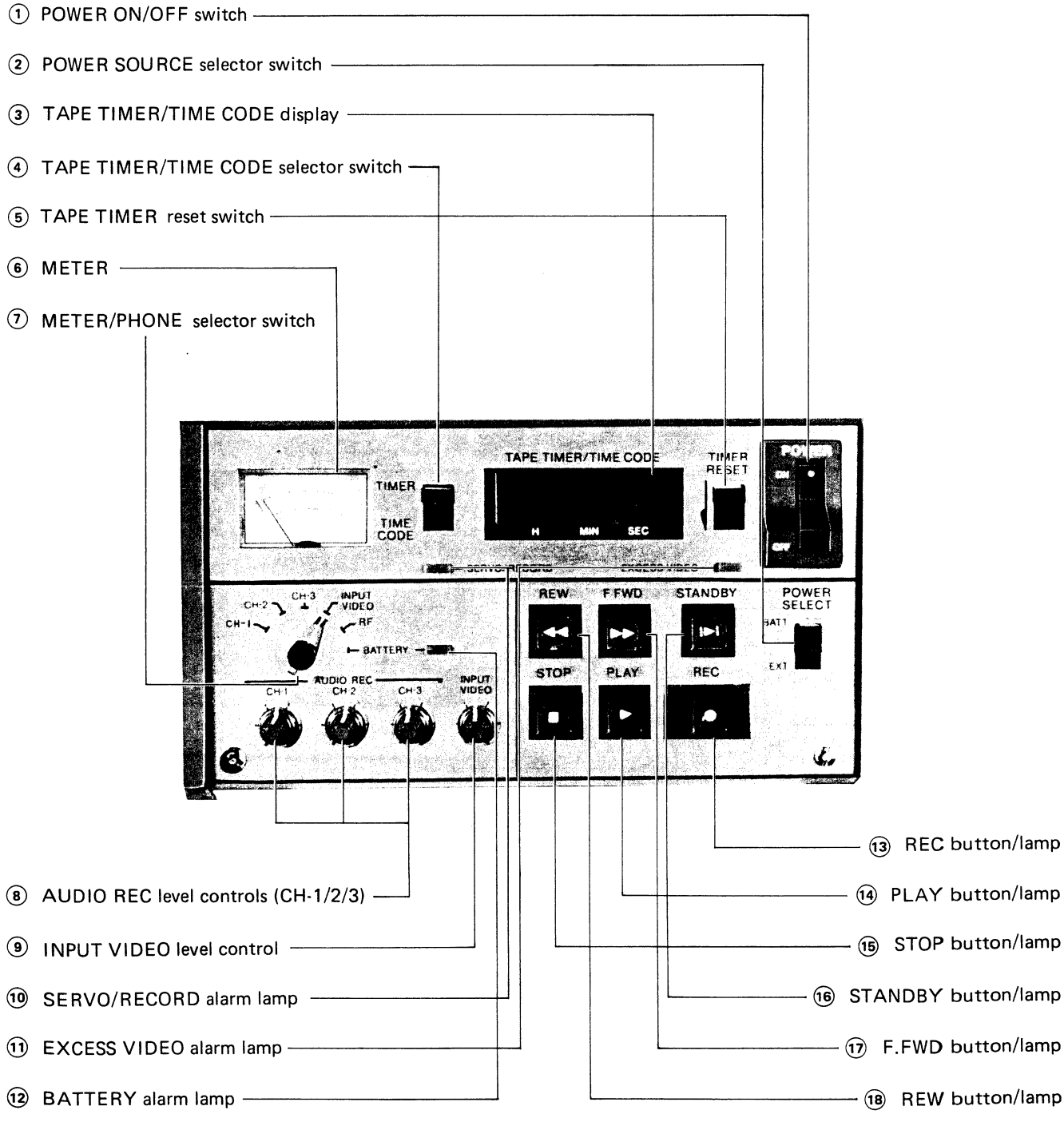
1-3. DESCRIPTION OF PARTS AND CONTROLS



1-3-1. Tape transport



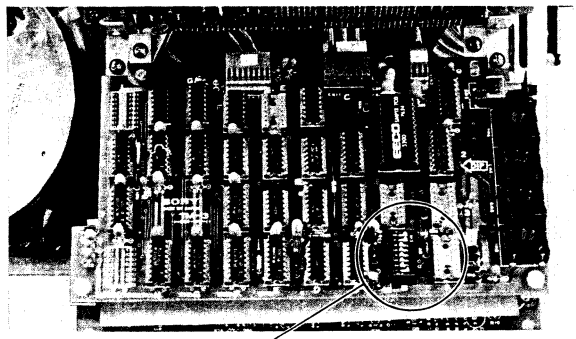
1-3-2. Function control panel



① **POWER ON/OFF switch**
When this switch is set to ON, the STOP button/lamp lights up, and the VTR can now be operated (from the stop mode). In the stop mode, the VTR consumes 20 times less power than under normal conditions of use. The TAPE TIMER/TIME CODE display displays TIMER regardless of the position of the TAPE TIMER/TIME CODE selector switch. No signals are applied to the audio and video systems.

② **POWER SOURCE selector switch**
Use it to select the power source.
EXT: Set here when you have connected an AC adaptor (AC-500CE) to the DC IN connector on the connector panel.
BATT: Set here when the internal batteries have been loaded. (Refer to page 1-15 for the battery loading procedure.)
- Two fully charged Sony BP-90 battery packs give approximately 90 minutes continuous recording.
- Set this switch to EXT so that there is no excess drain on the batteries when not in use. (A current of between 300 and 400μA flows through the time code memory circuit at all times.)

③ **TAPE TIMER/TIME CODE display**
This liquid crystal digital display displays the tape time or the time code in accordance with the position of the TAPE TIMER/TIME CODE selector switch. With tape time displays, the number of rotations of the tape timer roller in the tape transport mechanism is counted and then displayed in 4 digits ($00_{MIN}00_{SEC}$). Positive values are not indicated but for negative values the "–" sign lights up. With time code displays, the time code of the time code generator inside is displayed in 6 digits ($00_{H}00_{MIN}00_{SEC}$).
The time codes are displayed only in the REC/standby mode, and not in any other mode. Furthermore, by selecting the DIP switch on the TM-3 circuit board inside, it is possible to select between FREE-RUN for counting from the point of power on regardless of the mode and REC-RUN for counting with every start. (This switch is set to FREE-RUN at the factory.)



- The tape time display is stored in the memory for about one hour after the power has been cut off.
- The time code display is stored in the memory for about five minutes after the battery power has been switched off. (Refer to section 1-7-5 for operation.)

④ **TAPE TIMER/TIME CODE selector switch**
Use this switch to select the TAPE TIMER/TIME CODE display.
TIMER: The tape time is displayed.
TIME CODE: The time code is displayed.
The time code is displayed only when the videocorder is set to the REC/standby mode.

⑤ **TAPE TIMER reset switch**
Use this to reset the tape time to 00.00.
For time code presetting, refer to "sub-control panel-2".

⑥ **METER**
This indicates battery voltage, audio level, input video level (sync level) or RF level during recording or playback.
The METER/PHONE selector switch selects the quantity to be displayed.

⑦ **METER/PHONE selector switch**
This selects the input to the meter display and the monitor output (headphones).
AUDIO CH-1/2/3: The audio REC/PB level is displayed in VU. By selecting this position, the output signals of the channel corresponding to the selected position appear at the HEADPHONES jack.
INPUT VIDEO: The input video level connected to the VIDEO IN or CAMERA connector on the connector panel is displayed.
RF: The playback RF level of the video head is displayed.
BATTERY: The DC voltage is displayed. During battery operation, the pointer goes into the red zone when the battery voltage falls below 11 V.
- The output at the HEADPHONES jack is the audio CH-1 output when the switch is set to INPUT VIDEO, RF or BATTERY.

⑧ **AUDIO REC level controls (CH-1/2/3)**
Set the METER/PHONE selector switch to either AUDIO CH-1, AUDIO CH-2 or AUDIO CH-3, and adjust the set channel control knob so that the meter pointer points to 0 VU at the standard level. (It is not possible to adjust the playback level.)

⑨ **INPUT VIDEO level control**
Set the METER/PHONE selector switch to INPUT VIDEO, then adjust this control knob so that the meter pointer points to the center of the blue zone.
- Proceed as above and adjust the level when connecting the sync signal as the servo reference signal during playback to the VIDEO IN connector on the connector panel.

⑩ **SERVO/RECORD alarm lamp**
This alarm indicator lamp lights up when the servo lock has been disengaged in playback mode or when the video/sync head is clogged in recording mode.

⑪ **EXCESS VIDEO alarm lamp**
This lights up when video input signals, which present the danger of overmodulation, are supplied. When it lights up, check the input video level.
If the meter, switched to INPUT VIDEO reads normal, the problem lies with the input video signal. Check operation (iris, video level, chroma level, aperture, etc.) at the camera end or re-check the signal source.

⑫ **BATTERY alarm lamp**
This flashes when the terminal voltage of the built-in batteries is 11 V and it lights up steadily when this voltage falls below 10.8 V.

⑬ **REC button/lamp**

The videocorder is set to the recording mode when this button/lamp is pressed together with the PLAY button.
If a camera (Sony BVP camera) is connected to the CAMERA connector on the connector panel, a remote control operation can be performed (including REC mode) with a command from the camera. (Refer to the section on the "BACK SPACE EDIT ON/OFF switch" on the connector panel.)

- The videocorder is set to the REC test mode when the REC TEST/REC INHIBIT ON/OFF switch is set to REC TEST ON. (Refer to the section on the "Sub-control panel-1.")

To release the videocorder from the REC mode, depress either the STOP, F.FWD or the REW button. Alternatively, release can be performed by remote control from a camera when used.

⑭ **PLAY button/lamp**

When this button is depressed, the videocorder is set to the normal playback mode.
If a video/sync signal or camera is connected to the VIDEO IN connector on the connector panel, the playback servo is engaged with these signals. when no signals are supplied, the internal servo lock is automatically selected.
To release the playback mode, press either the STOP, F.FWD or REW button.

⑮ **STOP button/lamp**

Any mode of the videocorder except standby* and back space editing can be stopped when this button/lamp is depressed. Mechanically, the reel motor stops, the pinch roller is released and the reel brake is applied.

* The audio and video systems are set to EE when this button is pressed at standby ON.
When this button is pressed at standby OFF, the videocorder is set to the power-saving mode 10 to 15 seconds later (only the STOP button/lamp lights up).
With auto stop before-tape-end (during recording, playback or fast forward), the videocorder's standby mode (at ON) automatically goes off 10 to 15 seconds later.

- When the tape has been disengaged from the tape transport system (with rewind, etc.), the stop mode is set automatically.

⑯ **STANDBY button/lamp**

This is for head drum rise (rotation). Push to set it to ON and push again to release it.
For normal use, push this button to the ON position and set the videocorder to the desired mode after the head drum has risen.

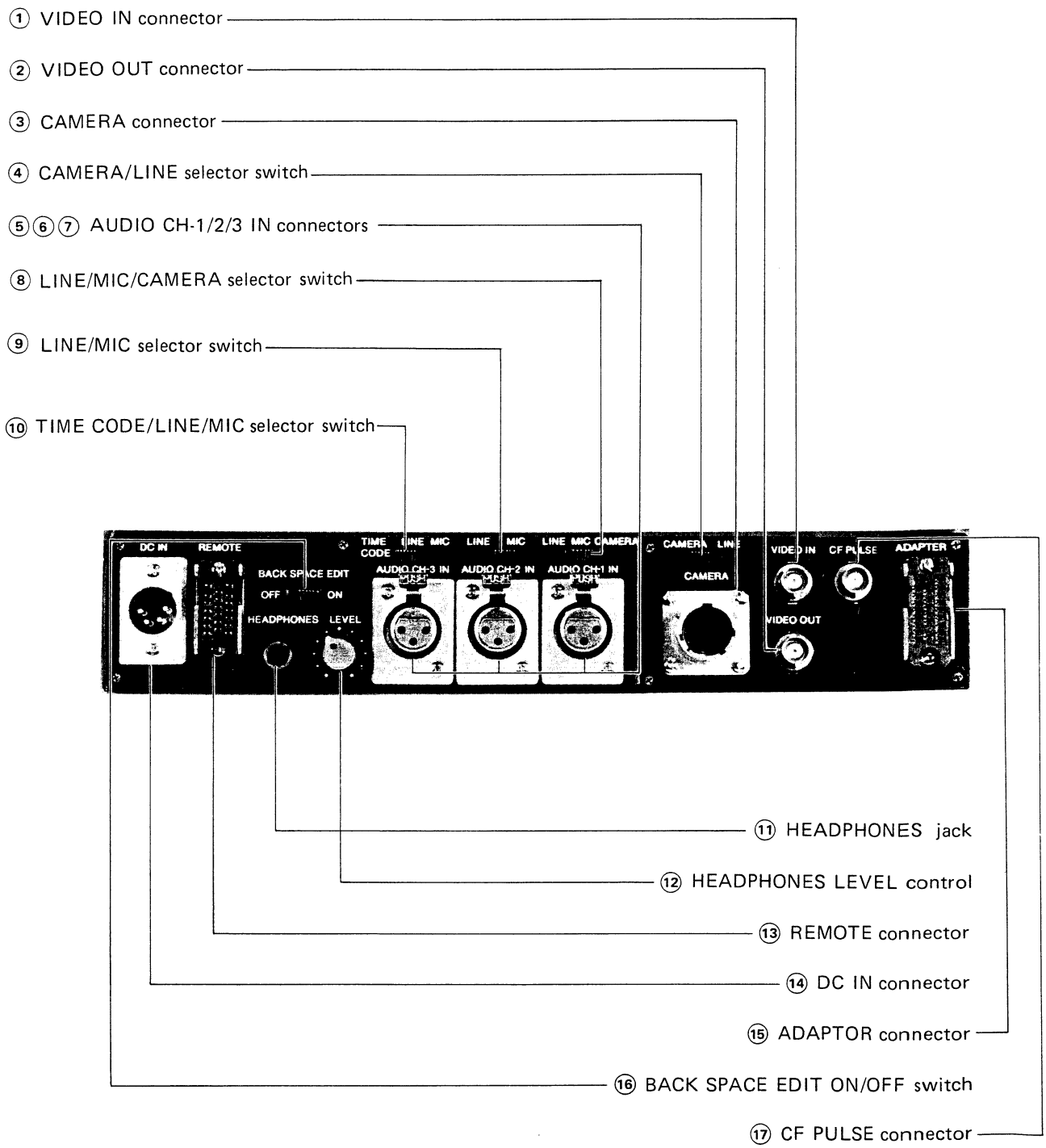
⑰ **F.FWD button/lamp**

When this button is depressed, the button/lamp lights up and the videocorder is set to the fast forward mode. To release the FF mode, depress the STOP, PLAY or REW button.

⑱ **REW button/lamp**

When this button is depressed, the button/lamp lights up and the videocorder is set to the rewind mode. To release the REW mode, depress the STOP, PLAY or F.FWD button.

1-3-3. Connector panel



① **VIDEO IN connector**
BNC connector, composite video 1.0 Vp-p, 75-ohm termination
The input video signals can be switched with the CAMERA/LINE selector switch as follows:

CAMERA/LINE switch
- CAMERA: Camera input from the 14-pin camera connector
- LINE: Input of this connector (VIDEO IN)

This connector is also used for the playback servo reference signal (video/sync).

② **VIDEO OUT connector**
BNC connector, 1.0 Vp-p, 75 ohms
When using this as a monitoring connector (B/W), connect the monitor TV directly. When a heterodyne unit or a time base corrector is connected, colour playback will be possible. For playback signal transmission, connect the PB adaptor/time base corrector to the ⑮ ADAPTOR connector.

③ **CAMERA connector**
14-pin special connector
Connect a Sony BVP camera to this connector. When such a camera is connected, the signals are as follows:

MIC IN:	MIC input signal connected to camera head
VIDEO IN:	Video input signal from camera
VIDEO OUT:	Return video signal from videocorder
BATTERY ALARM:	Signal warns of VTR battery condition via viewfinder tally lamp.
REC TRIGGER:	Videocorder's REC start or stop command
CAMERA ALARM:	Signal warns of videocorder drum unlock, no drum rotation, excess video, video confidence via tally lamp. (flashes) lights up ——→ REC mode
CAMERA STANDBY:	Signals set videocorder's drum rotation on and off. Return audio select signals from videocorder superimposed (mixed) audio signals can be monitored at camera head.

④ **CAMERA/LINE selector switch**
Use this to select the video input.
CAMERA: For input signals from the CAMERA connector
LINE: For input signals from the VIDEO IN connector

⑤

⑥ **AUDIO CH-1/2/3 IN connectors**

⑦ 3P-XLR Cannon connectors
The input level and impedance depend on the positions of switches ⑧, ⑨ and ⑩

⑧ **LINE/MIC/CAMERA selector switch (AUDIO CH-1)**

⑨ **LINE/MIC selector switch (AUDIO CH-2)**

⑩ **TIME CODE/LINE/MIC selector switch (AUDIO CH-3)**

CAMERA:	600-ohm impedance, balanced
LINE:	600-ohm impedance, balanced, +27 to −22 dBm
MIC:	600-ohm impedance, balanced, −60 dBs (−72 to −20 dBs)
TIME CODE:	Use this position to record the output of the built-in time code generator onto audio CH-3. (Level is preset to standard level.)

⑪ **HEADPHONES jack**
Binaural jack
Plug in headphones with an 8- to 1 k-ohm impedance into this jack. (Level is adjustable.)
Select AUDIO CH-1, CH-2 or CH-3 using the METER/PHONE selector switch. (For further details, refer to the section on the "METER/PHONE selector switch".) When the headphones are plugged into this jack, the output signals no longer become available in the monitor output of the ADAPTOR connector.

⑫ **HEADPHONES LEVEL control**
Use this to adjust the level of the headphones plugged into the HEADPHONES jack from −30 dB to −13 dB.
It is possible to vary the monitor output level of the ADAPTOR connector when the headphones are not plugged into the HEADPHONES jack.

⑬ **REMOTE connector**
20-pin special connector
The videocorder can be operated by remote control by connecting the optional remote function box to this connector. Recording, playback, stop, fast forward, rewind and standby mode command, lamps, display and servo (capstan lock) lamp as well as the +5 V (one is 15 to 20 mA and another is 200 mA max. in the non-power-saving mode) signals are all available here. (Parallel operation is the basis of operation.)

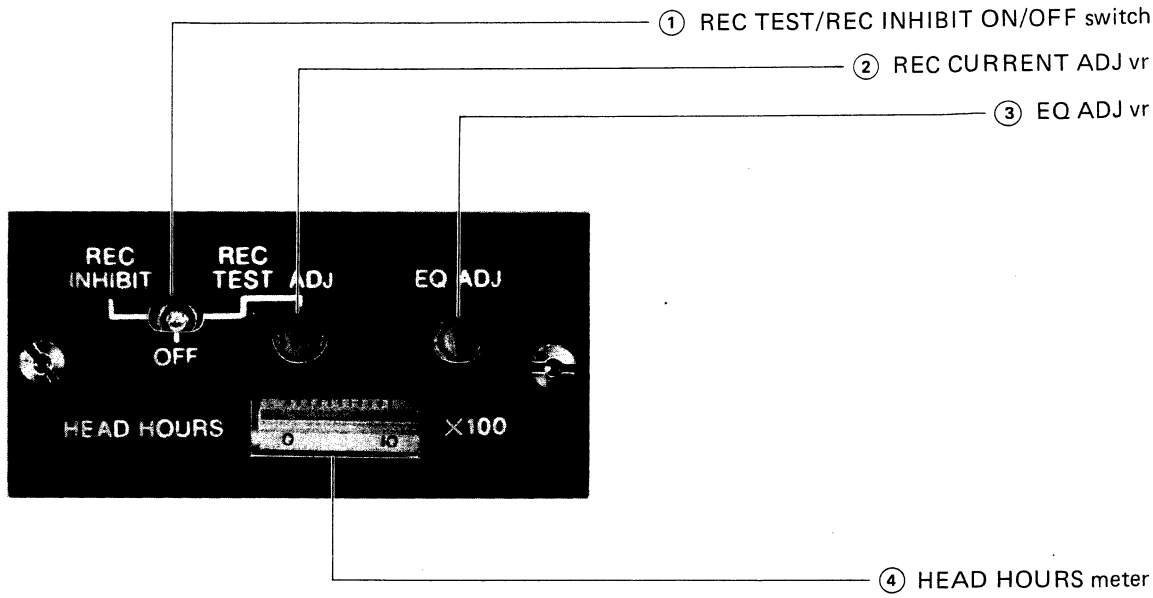
⑭ **DC IN connector**
4P-XLR Cannon connector
Connect the optional AC adaptor (AC-500CE) here.
Use the POWER SOURCE selector switch on the function control panel to select battery and external power. (Capacity: DC 12 V, 6 to 8 A)

⑮ **ADAPTOR connector**
24-pin special connector
By connecting the optional PB adaptor or time base corrector, audio and video characteristics, which are equivalent to those of the BVH-1100PS, can be provided.

⑯ **BACK SPACE EDIT ON/OFF switch**
Use this switch to select ordinary recording or back space editing.
ON: For camera recording
The tape automatically rewinds for approximately 4 seconds at the end of camera recording and it stops. With TRIGGER ON, the tape plays back (servo locks) and then assemble editing can be performed.
Lamp alarm at the camera end is changed from flashing to lighting up.
When the STOP button is depressed, the tape rewinds automatically for approximately 4 seconds and stops. Next, when the REC and PLAY buttons are pressed, assemble editing will be performed after the 4-second (8 sec. in colour frame mode) playback.
OFF: No back space editing
When the REC and PLAY buttons are depressed, the videocorder is set to the REC mode.

⑰ **CF PULSE connector**
BNC connector, TTL level, 50% duty cycle, negative edge
This input connector for recording and playback handles the 6.25 Hz colour frame pulses (sync signals).
During playback, colour frame discriminating signals are recorded on the CTL track (on the tape) only.

1-3-4. Sub-control panel-1



① **REC TEST/REC INHIBIT ON/OFF switch**

REC TEST ON: Use this switch when adjusting the recording current of the video head. When it is set to this position and the REC and PLAY buttons are depressed, the videocorder can be set alternately to the recording and playback modes repeatedly at 0.8 to 1.0 second intervals.
For adjustments, set the METER/PHONE selector switch on the function control panel to RF, and then adjust the REC CURRENT ADJ variable resistor so that the pointer deflects to the maximum.
The REC button/lamp flashes when the recording current is being adjusted.
Furthermore, when the PLAY button is depressed, the videocorder is set to the still mode (PLAY button/lamp flashes). However,unless this switch is set to OFF, the videocorder mode cannot be transferred to any mode (PLAY, REC, F.FWD, REW) except the stop mode.

- When the videocorder is set to the play, recording, fast forward or rewind mode and the switch is then set to ON, the videocorder will then be set to the stop mode.

REC TEST OFF: The recording current test function goes off (the videocorder is set to the stop mode).

REC INHIBIT ON: This switch serves to prevent the videocorder from entering the recording mode, and so set it to this position when playing, rewinding or fast forwarding a pre-recorded tape. (The REC command is inhibited.)

REC INHIBIT OFF: The REC inhibit function goes off.

② **REC CURRENT ADJ vr**

Use this to adjust the recording current of the video head's video/sync channel.

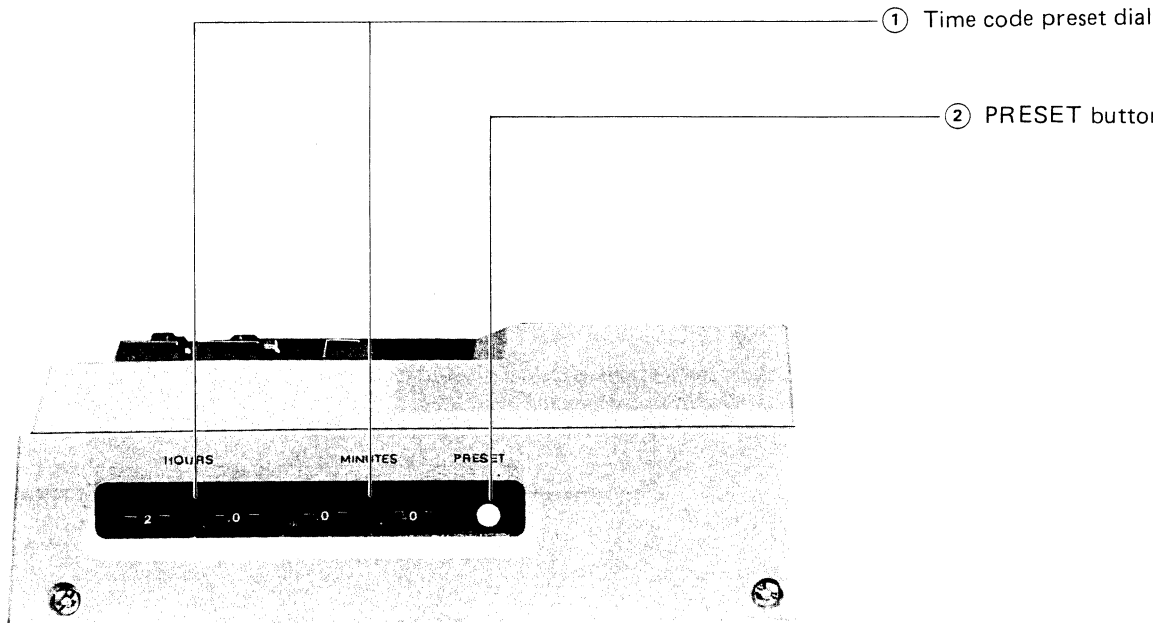
③ **EQ ADJ vr**

Use this to compensate for the frequency response of the video signals during playback.
Set this variable resistor to the appropriate value when connecting the optional playback adaptor and time base corrector.

④ **HEAD HOURS meter**

Hour meter with total capacity of 1000 hours
This is actuated as the drum starts to rotate and indicates the number of hours the head has been used.

1-3-5. Sub-control panel-2



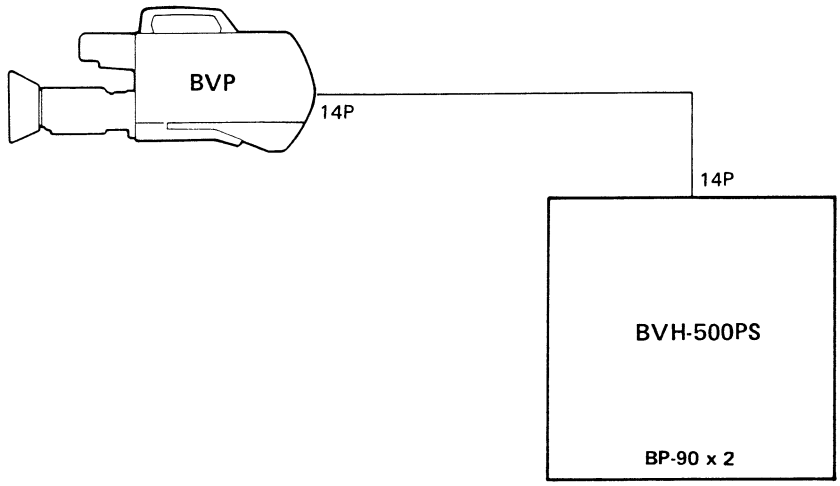
① **Time code preset dials**
Use this to set the time code (00_H00_{MIN}).

- Second, frame digits 00.00
- When recording the time code on audio CH-3, always set the TIME CODE/LINE/MIC selector switch on the connector panel to TIME CODE.

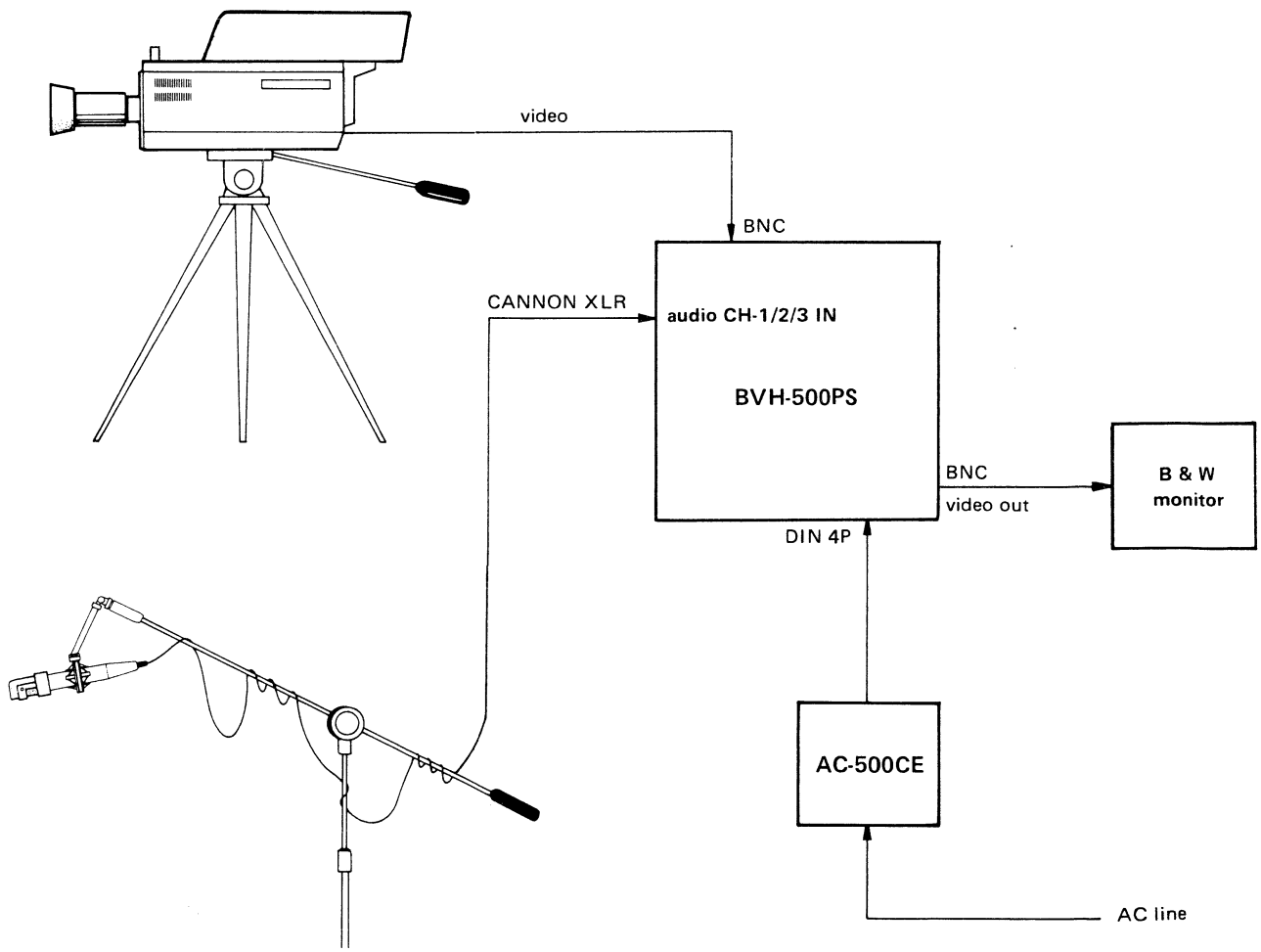
② **PRESET button**
Depress this button to start with the time code which has been set with the time code preset dials.

1-4. CONNECTIONS

1-4-1. Battery operation (field location)

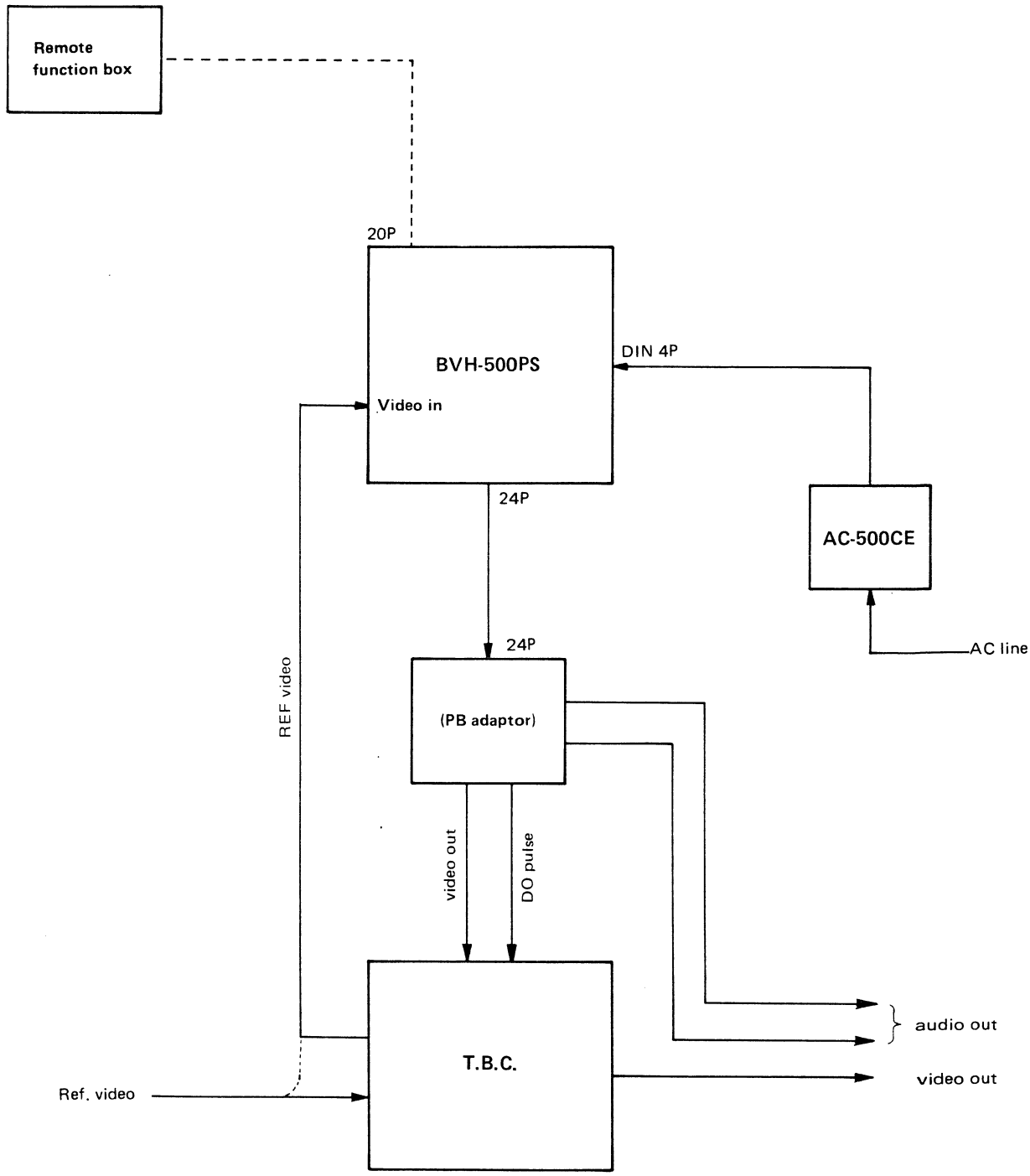


1-4-2. AC operation (studio use)



1-4-3. Playback

Since BVH-500PS is a model designed especially for recording, playback is usually performed using the BVH-1100PS.



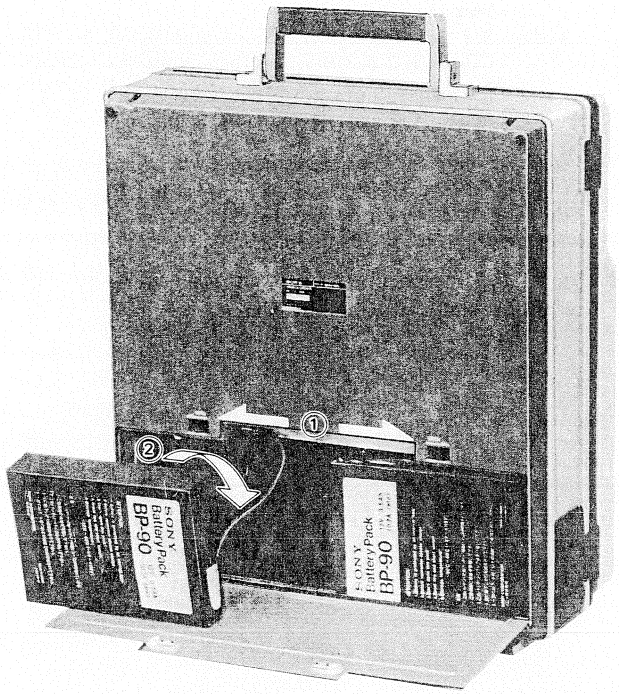
1-5. BATTERY INSERTION

1) Use two Sony BP-90 battery packs.

2) Check that the batteries are fully charged. (When the charge of the two batteries is not balanced, the operation may be unstable. This may also damage the battery pack.)

3) Open the battery case, place the batteries in the battery case as shown in the figure, and insert the plug into the jack.

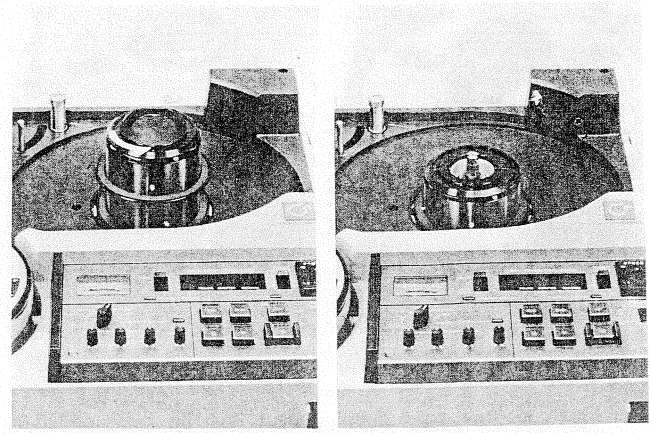
- Do not use any battery pack other than Sony's product. Polarity of the battery plug may differ with the manufacturers.



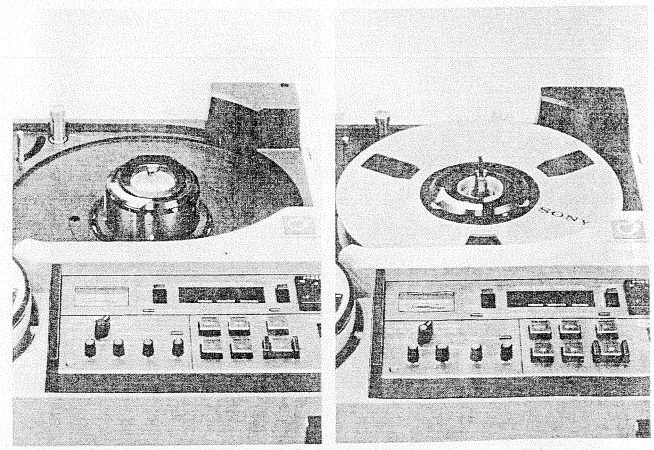
4) Close the battery case. This completes the procedure for the battery insertion.

1-6. TAPE THREADING

1) Rotate the reel lock of the take-up reel table counterclockwise, align with the "green" and "red" marks, and remove the take-up reel table.

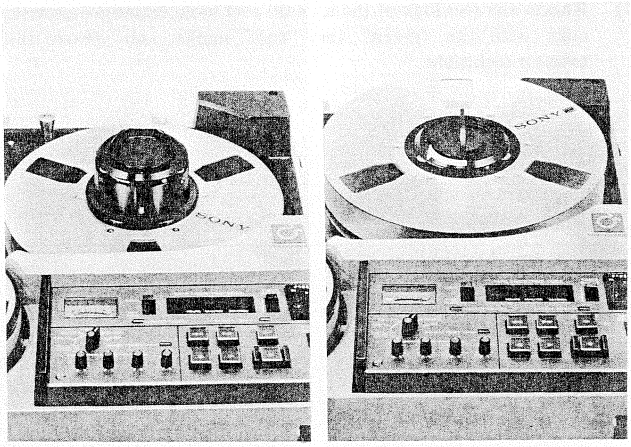


2) Rotate the reel lock of the supply reel table counterclockwise, and align with the "green" and "red" marks. Next, place the tape reel on top of the supply reel table, match the three slots of the reel with the three pins of the reel table, rotate the reel lock in the opposite direction (clockwise) as far as the place where the "green" and "green" marks are aligned, and secure. (The tape reel is now anchored firmly.)

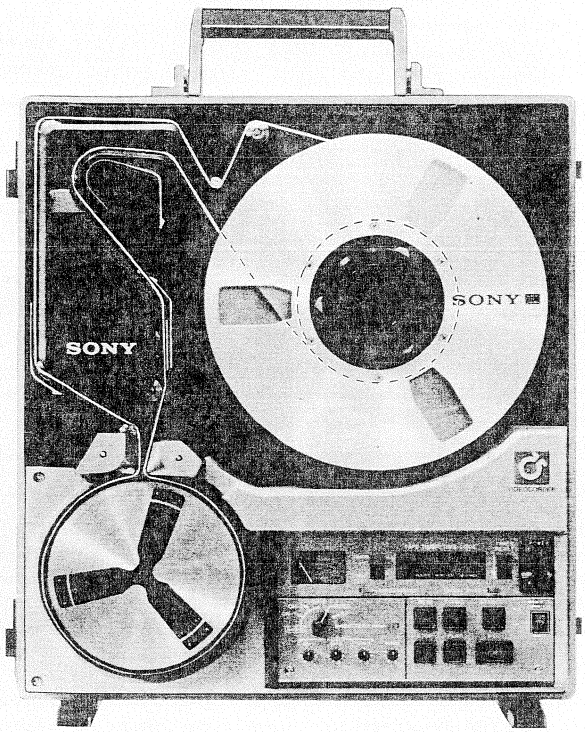


3) Place the take-up reel table over the reel spindle.
Now place the empty reel on the take-up reel table, rotate the reel lock clockwise as far as the place where the "green" and "green" marks are aligned, and secure. The empty reel (for the tape) is now anchored firmly.

- When placing the take-up reel table over the reel spindle, make absolutely sure that it is fully inserted. (There will be a clicking sound when the take-up reel table is rotated.)
- Use the same size standard for the two reels, for example, two 9-inch reels, for this videocorder.



4) Draw out the tape from the tape (supply) reel, and after threading it as shown in the figure, take up the slack by rotating the reel by hand.



1-7. OPERATION

1-7-1. Preparations

1) Check the input and output cable connections and the condition of the battery (by observing the METER and BATTERY alarm lamps).

2) Adjust the level of the video and audio input signals. Once the videocorder has been set to the standby mode, depress the STOP button and set to the EE mode.
   Video: Set the METER/PHONE selector switch to "INPUT VIDEO" and adjust the INPUT VIDEO level control so that the meter pointer deflects to the center of the blue zone.
   Audio: Set the METER/PHONE selector switch to AUDIO CH-1, CH-2 or CH-3, and then adjust the corresponding channel control, which has been set, so that the meter pointer deflects to 0 VU with a standard level.

3) When recording the time code on audio CH-3, set the TIME CODE/LINE/MIC selector switch on the connector panel to TIME CODE. (There is no need for this adjustment if the level is set already to the standard level.)

4) Set the BACK SPACE EDIT ON/OFF switch to ON or OFF in accordance with the application in mind.

1-7-2. Recording

1) Set the REC TEST/REC INHIBIT ON/OFF switch on the sub-control panel-1 to REC TEST and then adjust the recording current as follows.
Press the REC and PLAY buttons first, and the videocorder will be repeatedly set alternately to the recording and playback modes at 0.8 to 1.0 second intervals. (The REC button/lamp flashes). Then, set the METER/PHONE selector switch to RF, and adjust the REC CURRENT ADJ variable resistor so that the pointer deflects to the maximum. Upon completion of the adjustment, set the switch to REC TEST OFF.

2) Depress the STANDBY button to cause the head drum to rise.

3) Depress the REC and PLAY buttons and set the videocorder to the recording mode. (The tape now starts to travel.) When a Sony BVP camera has been connected, it is possible to set the videocorder to the recording mode with a trigger signal from the camera.
Check that the alarm lamps have not come on.

4) To release the recording mode, depress the videocorder's STOP button or supply a trigger signal from the camera.

- When two or more operating buttons (except the REC and STANDBY buttons) are pressed simultaneously, one of them is given priority in the following order.
  (1) STOP button (stop mode)
  (2) PLAY button (playback mode)
  (3) F.FWD button (fast forward mode)
  (4) REW button (rewind mode)
- To record in the colour frame mode, be sure to connect the specified signal to the CF PULSE connector on the connector panel.

1-7-3. Playback

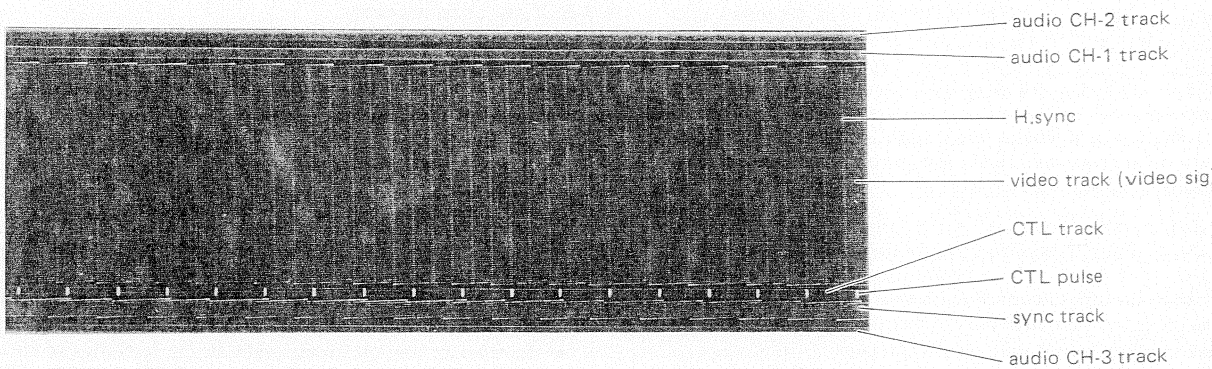
The connector panel is equipped with a VIDEO OUT connector, but since this is a model designed especially for recording (news gathering), playback is usually performed using the BVH-1100PS.

When a colour monitor is connected to the VIDEO OUT connector, and the PLAY button is pressed to perform playback with this videocorder alone (no adaptor used), the colour signals will not be stable, because the recording system is of the high-band FM direct type, and the pictures will appear effectively in black and white.

Set the REC TEST/REC INHIBIT ON/OFF switch to REC INHIBIT ON during playback. The videocorder will then be prevented from entering the recording mode due to incorrect operation. In this way it is possible to prevent accidents in which important news data, etc. would be erased.

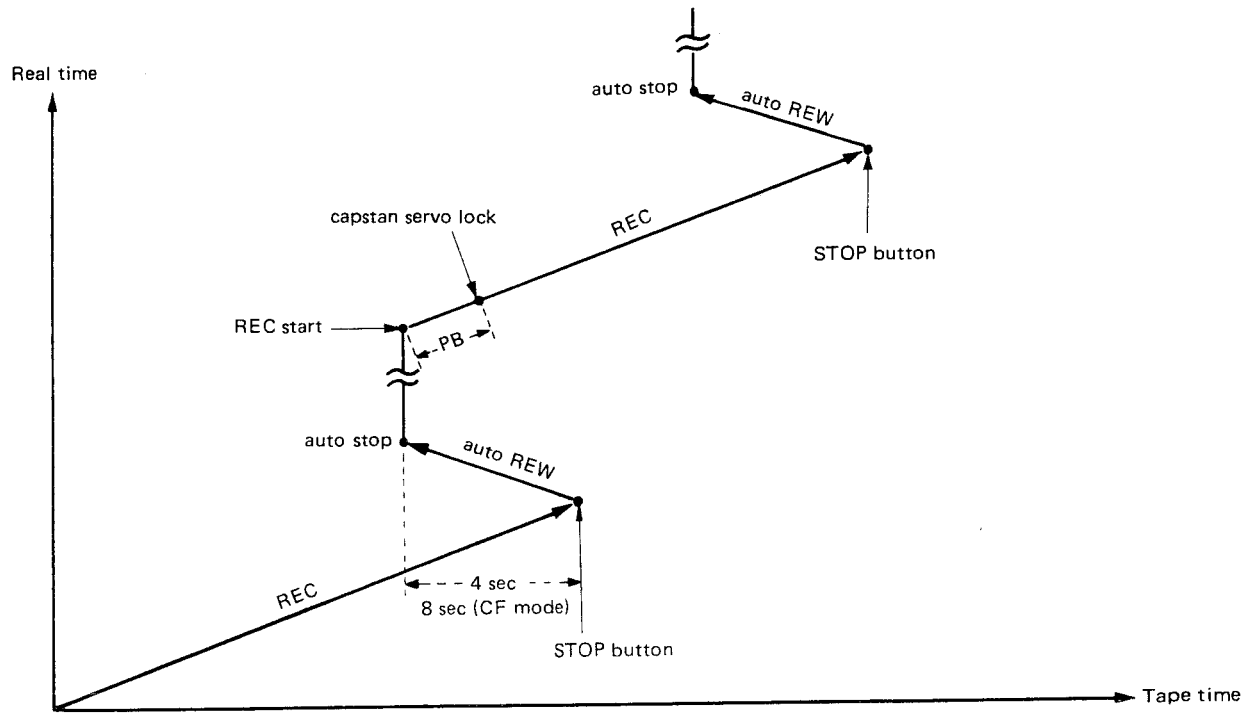
- During playback, it is not possible to display the time code which has been recorded on audio CH-3 track, and so set the TAPE TIMER/TIME CODE selector switch to the TIMER position.

The tape patterns recorded on this videocorder are as shown in the photo.



1-7-4. Back space editing

Set the BACK SPACE EDIT ON/OFF switch to ON; the operations shown in the figure below are repeated at the end of every recording.



As indicated in the figure, if the STOP button is depressed or a trigger signal supplied from the camera at the end of the recording, the tape will automatically reverse for 4 seconds and the videocorder will be set to the auto stop mode.

When the REC start command is now issued, the videocorder will be set to the playback mode, and then to the recording mode (assemble editing) when the capstan servo is locked.

In other words, the pictures are not disturbed at the transitions between recorded sections but are joined together in sequence.

The back space editing function is for assemble editing, and there is no insert editing function allowing the pictures or sound (or both) to be replaced at sections of a pre-recorded tape.

- When using the back space editing function, the audio CH-3 time code is disturbed for several frames at the joins.

1-7-5. Time code memory

When the POWER switch is at OFF

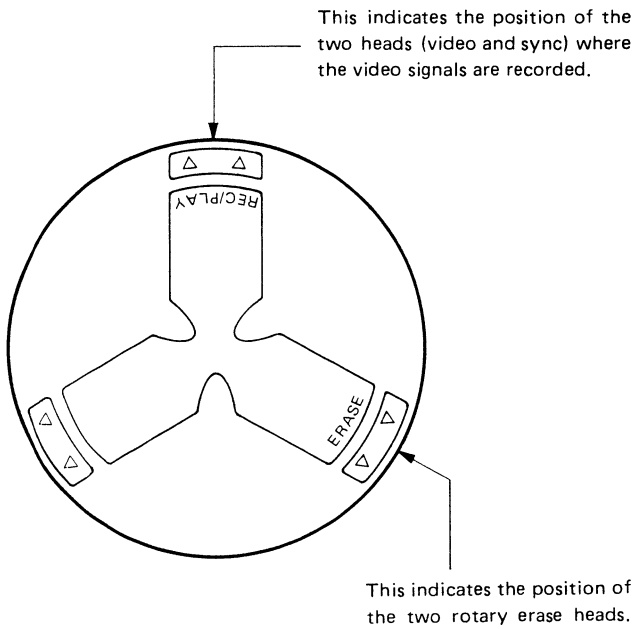
1) When the power is being supplied from the internal batteries (BP-90) or external power supply (AC-500), the time code is stored in the memory even if the model's POWER switch set to OFF (with the POWER SOURCE selector switch in the same position).

2) When the power supply from the internal batteries (BP-90) or external power supply (AC-500) is temporarily cut off, the time code is stored in the memory immediately afterward for about 5 minutes.
   - In order to prevent excess drain on the batteries when the model is not being used, set the POWER SOURCE selector switch to the position which does not correspond to the value of the power being supplied (set to EXT when the batteries are being used).

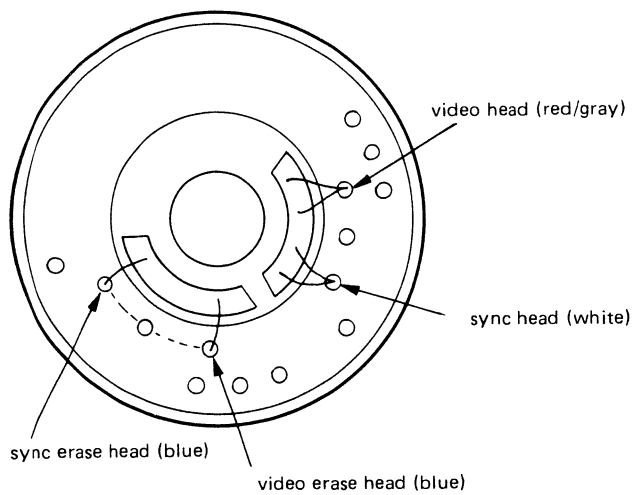
1-8. REGULAR MAINTENANCE

- In order to keep the rotary head from clogging, wipe the video and erase heads with a piece of chamois leather dipped in freon or alcohol.

The figure below shows the different heads (drum top).



The positions of the heads when the drum top is removed are shown in the figure below.

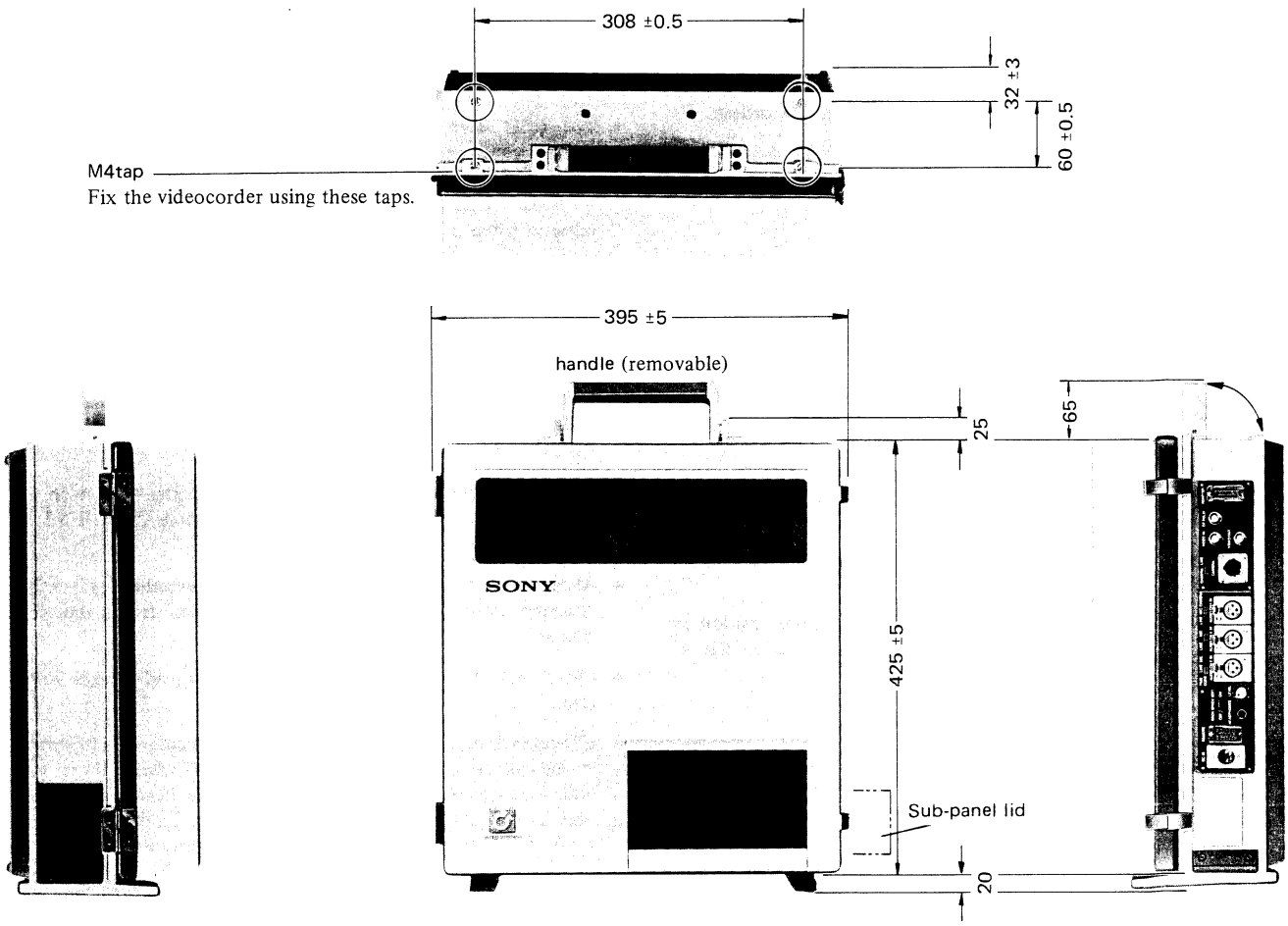


- Always keep the surfaces of the fixed heads (audio REC/PB head, video monitor head and audio erase head) clean.
- Also, keep the tape guide and guide rollers which come into contact with the tape clean at all times.

1-9. PRECAUTIONS

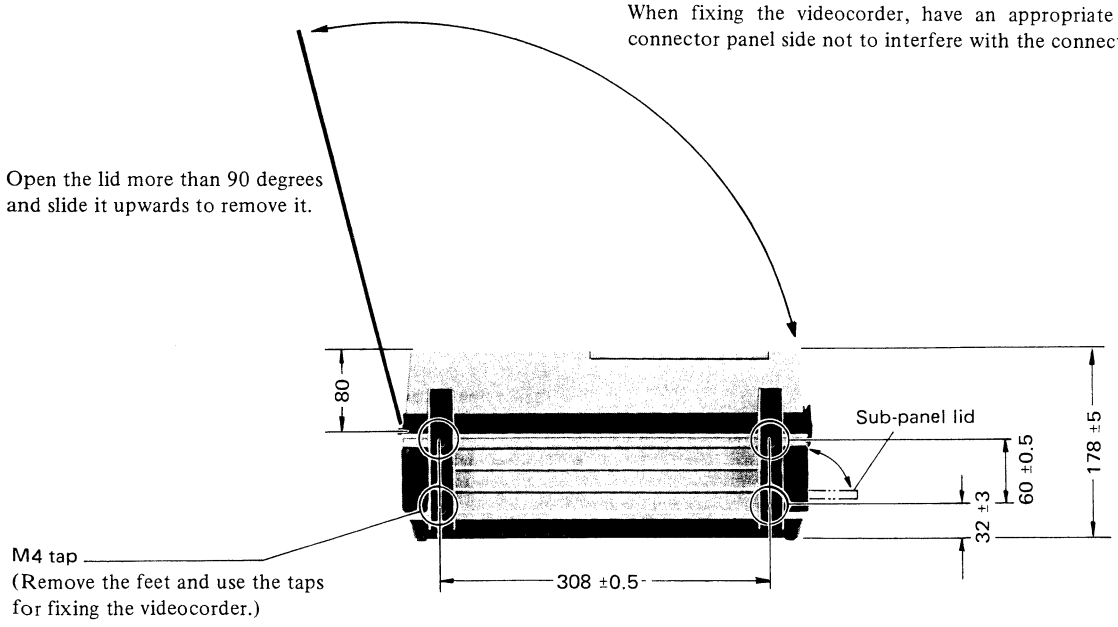
- When recording signals from the camera, check the settings of the connector panel switches and the input signal level.
  Tape threading state
  Position of METER/PHONE selector switch
  Video, audio signal input levels
  Position of BACK SPACE EDIT ON/OFF switch
  Position of CAMERA/MIC/LINE/TIME CODE selector switch
  Position of REC INHIBIT ON/OFF switch
- The REC start command at the camera can be initiated no matter which mode the videocorder is set to.
  Therefore, set the REC TEST/REC INHIBIT ON/OFF switch to REC INHIBIT ON and cut off the command from the camera when a pre-recorded tape is being played back, etc.
- Handle the tape carefully
  Do not touch the coated surface of the tape.
  Do not crease the tape edge. If the tape end is creased or wrinkled, cut it off.
  Take care not to bend the tape when threading it.
  Do not use tapes with large creases or other damaged sections.
  Do not splice the tape.
- While the tape is traveling, do not inadvertently switch off the power or change over the power source (from EXT to BATT, or vice versa).
- Always check that the power has been switched off before plugging units into, or disconnecting them from, the connectors.
- Check that the batteries are fully charged and always insert two.
- Condensation may form on the drums when the videocorder is moved from one location to another where there is a quick change in the temperature. If a great deal of condensation forms, the drums may stop rotating. In cases like this, wipe off all the condensation or dry the drums out.
- Avoid recording and playback in a location subjected to a great deal of vibration.
- Do not use the videocorder in locations exposed to direct sunlight or other high temperatures, or to high humidity.
- Do not bring the videocorder near strong magnetic or electrical fields.
- Do not subject the videocorder to a violent shock during use.
- Remove the batteries if the videocorder is not to be used for a long period of time.
- Wipe off dirt and dust on the cabinet or panel with a dry soft cloth. Never use alcohol, benzine, thinners or other chemicals since these substances will impair the panel finish or rub away the markings.
- If the dirt or dust cannot be removed with the dry soft cloth, dip it in some neutral cleanser diluted with some water and then wipe clean. Afterwards, use a dry cloth to wipe away the remains of the cleanser.
- It is recommended to completely erase the existing program with a bulk eraser when a new recording is made with the tape on the take-up reel by putting that reel onto the supply spindle, or to rewind the tape onto the supply reel before recording; or the existing program may be erased incompletely.

1-10. FIXED USE



When fixing the videocorder, have an appropriate space at the connector panel side not to interfere with the connections.

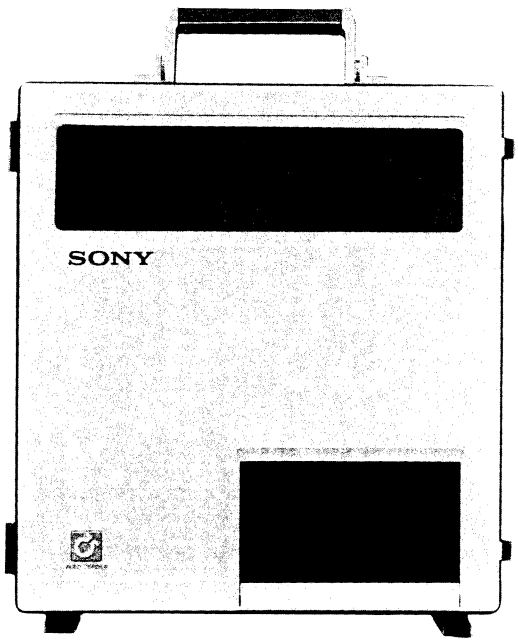
Open the lid more than 90 degrees and slide it upwards to remove it.



SONY

TRAGBARER VIDEO-RECORDER

BVH-500PS



BEDIENUNGS- UND WARTUNGSANLEITUNG

TEIL 1
BETRIEB

1-1. MARKMALE

EBU-Typ, C-Format
Modell BVH-500PS ist ein tragbarer 1-Zoll-PAL/SECAM-Videorekorder mit Direktaufzeichnung im oberen Frequenzmodulationsbereich, der speziell als Zusatzgerät für Sony's Sende-Videobandmaschine BVH-1100PS entwickelt wurde. Es können nicht nur dieselben Bänder wie für die BVH-1100PS, sondern auch dasselbe EBU-Bandformat (EBU-Format, C-Typ) verwendet werden.

Kompakte Größe und geringes Gewicht
Das Stapelspulensystem für bessere Platzausnutzung, das Chassis aus Aluminiumdruckguß, das Gehäuse in Schalenbauweise und die direkt mit dem flachen Motor gekoppelte Kopftrommel ermöglichten es, ein kompaktes und leichtes Gerät zu konstruieren.

Automatisches Rücksetzen-Schneiden (wählbar)
Die Rücksetzautomatik ermöglicht ein fortlaufendes Anfügen mit einwandfreien Übergängen von Szene zu Szene. Der mechanische Vorgang läuft wie folgt ab: Rückspulen einige Sekunden nach der Aufzeichnung ⟶ Stop (Bereitschaft) ⟶ Aufzeichnungs-Auslösung ⟶ Wiedergabe ⟶ Servoverriegelung ⟶ Aufzeichnung. Diese Vorgänge werden automatisch ausgeführt.

Digitales Servosystem
Eine digitale Servoschaltung findet Anwendung, die die Eingliederung einer Servoschleife mit hoher Auflösung bei Aufnahme/Wiedergabe ermöglicht.
Diese Schaltung eliminiert durch Einschwingamplitudenfehler verursachte Instabilität, die bei digitalen Steuerungen oft ein Problem darstellt, und sie quantisiert außerdem die Fehlersuche in spezieller nichtlinearer Form, um Auswirkungen des Kreiselfehlers, von Umweltveränderungen und der langsamen Nullpunktsverschiebung auf ein Minimum zu reduzieren.

Elektronisches Spannungsservosystem
Die Spezialphasenschaltung erfüllt zwei wichtige Funktionen: sie überwacht genau die Spulendrehzahl, und leitet den Aufwickelspulenmotor ein Rücksetzdrehmoment proportional zum Spulendurchmesser zu, um auf diese Weise Schwankungen der statischen Spannung zu eliminieren; sie leitet außerdem die sich ergebende Schwankung bei großer Geschwindigkeit in der Umkehrphase zurück, wodurch eine äußerst genaue Spannungsstabilität erzielt wird.

Rollbewegungsdämpfung
Das Spezialspannungsservosystem verbessert die Rollbewegungsdämpfung.

Warnsysteme

Batteriewarnung:	Sinkt die Spannung der eingesetzten Batterie unter einen brauchbaren, durch die Batterieentladungskurve bestimmten Pegel ab, blinkt die Warnlampe und zeigt schließlich durch dauerndes Aufleuchten einen niedrigen Spannungspegel an.
Kopfverschmutzungs- und Servowarnung:	Während der Aufnahme oder Servoverriegelung überwacht ein feststehender Videokopf das aufgezeichnete Synchronspitzensignal und löst bei Kopfverschmutzung, abgeschalteter Servoverriegelung oder anderen Aufzeichnungsdefekten ein Warnsignal aus. (Servo-/Aufnahme-warnanzeige)
Übersteuerungswarnung:	Der Videospitzenpegel wird überwacht und ein Alarm ausgelöst, wenn dieser Wert einen kritischen Pegel erreicht. (Videoübersteuerungs-Warnanzeige)

Schutzschaltungen

Bandende-Detektorkreis:	Diese Schaltung entdeckt die auf der Abwickelspule noch vorhandene Bandlänge. Der Bandlauf wird angehalten, wenn die verbleibende Bandlänge einen kritischen Wert unterschreitet. Diese Schaltung funktioniert sowohl bei Schnellvorlauf- als auch Aufnahme/Wiedergabe-Betrieb.
Trommeldrehzahl-Detektorkreis:	Diese Schaltung wird aktiviert, wenn sich Kondensat bildet und die Drehung der Trommel gestoppt wird. (Dadurch wird unnötiger Stromverbrauch verhindert.)
Detektorkreis für ungleichmäßigen Bandlauf:	Diese Schaltung bringt den Rekorder in Stop-Stellung, wenn die Bandgeschwindigkeit wegen Welligkeit oder sonstiger Beschädigung des Bandes nicht innerhalb eines festgesetzten Zeitraumes zumNennwert zurückkehrt.

Eingebauter EBU-Zaitcode-Generator
Der EBU-Zeitcode kann während der Aufnahme gleichzeitig auf Tonkanal 3 aufgezeichnet werden. Mit Hilfe des eingebauten Wahlschalters kann der Zeitcode auf REC-RUN (Aufnahmelauf) oder auf FREE-RUN (Freilauf) eingestellt werden.

Aufnahmestromeinstellung
Der optimale Aufnahmestrom kann einfach und schnell eingestellt werden.

Geringer Stromverbrauch
Integrierte C-MOS-Schaltkreise in der logischen Steuerschaltung, Hochleistungs-Schaltregler, verminderter Stromverbrauch bei Bereitschaftsstellung und der kernlose Hochleistungsmotor reduzieren den Stromverbrauch auf ein absolutes Minimum.

Lange Aufnahmezeit
Mit einer einzelnen Spule des Sony-Bandes hoher Dichte V-16 (9-Zoll-Spule) ist es möglich, bis zu 60 Minuten lang ohne Unterbrechung und Bandwechsel aufzuzeichnen.

Zu den sonstigen wichtigen Merkmalen gehören
Selbstleuchtende logische Bedienungstasten zum leichten Erkennen der Bedienungselemente, digitale Flüssigkristallanzeige für geringen Stromverbrauch, Wiedergabeausgangsanschlüsse für Schwarzweiß-Überwachung und ein staub- und wasserdichtes Gehäuse für zuverlässigen Betrieb selbst bei den widrigsten Wetterverhältnissen im Freien. Alle diese Merkmale tragen zu größerem Bedienungskomfort, bequemerem Tragen und größerer Zuverlässigkeit dieses hochwertigen Sende-Videorekorders bei.

1-2. TECHNISCHE DATEN

Stromversorgung	12 V Gleichspannung
Leistungsaufnahme	56 W
Betriebstemperatur	0° bis 40°C
Feuchtigkeit	10% bis 90% (nicht kondensierend)
Abmessungen	Siehe „Feststehender Einsatz"
Gewicht	Ca. 22 kg (einschließlich Batterien, Band, Spulen)
Aufnahmesystem	Direktaufzeichnung im oberen Frequenzmodulationsbereich
Bandgeschwindigkeit	23,98 cm/s
Aufzeichnungsgeschwindigkeit (relative Geschwindigkeit)	21,39 m/s
Aufnahme-/Wiedergabezeit	63 min. (mit 9-Zoll-Spule)
Rückspulzeit	Ca. 4,5 min (mit 9-Zoll-Spule)
Verriegelungszeit	Weniger als 3,5 s (Bereitschaftsstellung)
Betriebsposition	Horizontal oder vertikal
Empfohlene Bänder	Sony 1-Zoll-Band hoher Dichte (V-16-Reihe) oder gleichwertiges
Spulengröße	8", 9", 9,25", 9,5"
Bandzeit-Zählwerk	99 min, 59 s
Batteriekapazität	90 min (bei Verwendung von zwei vollaufgeladenen Sony-BP-90-Akkus)

Video

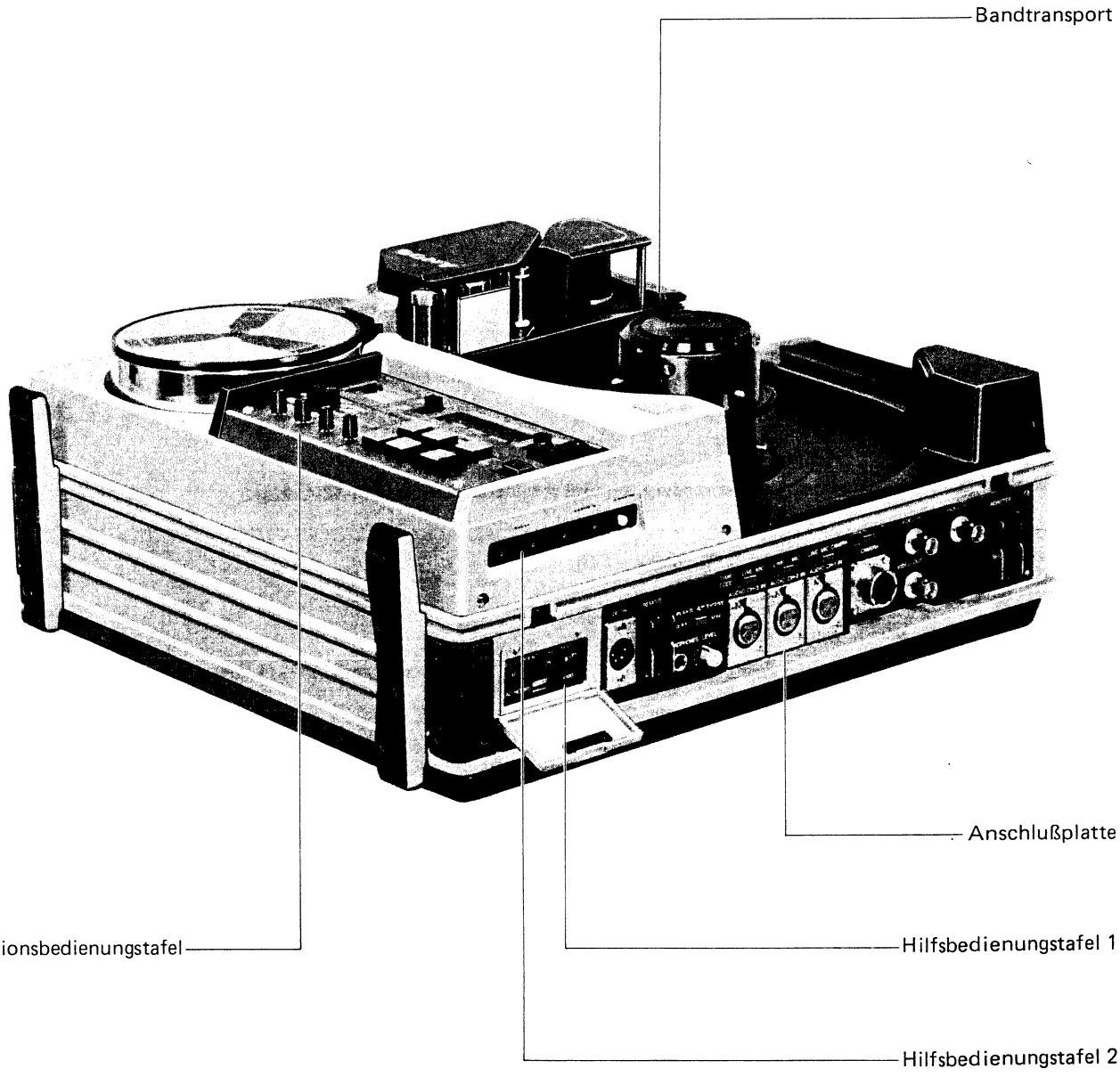
Bandbreite	5,5 MHz ±0,5 dB 6MHz −3 dB	Wiedergabe mit BVH-1100PS
Signal-Rauschabstand	Besser als 43 dB	
Differentialverstärkung	Weniger als 4%	
Differentialphase	Weniger als 4°	
Einschwingverhalten	Weniger als 1% (2T-Impuls)	
Moiré	Weniger als −35 dB (75% Farbbalken)	
Chrominanzverzögerung	Weniger als 25 ns	
Eingang	1,0 V_{ss}, 75 Ohm	
Monitorausgang	1,0 V_{ss}, 75 Ohm (Farbe nicht stabilisiert)	
CF-Impulseingang	6,25 Hz, 50% Einschaltdauer TTL (Farbbildsteuerservo)	

Audio

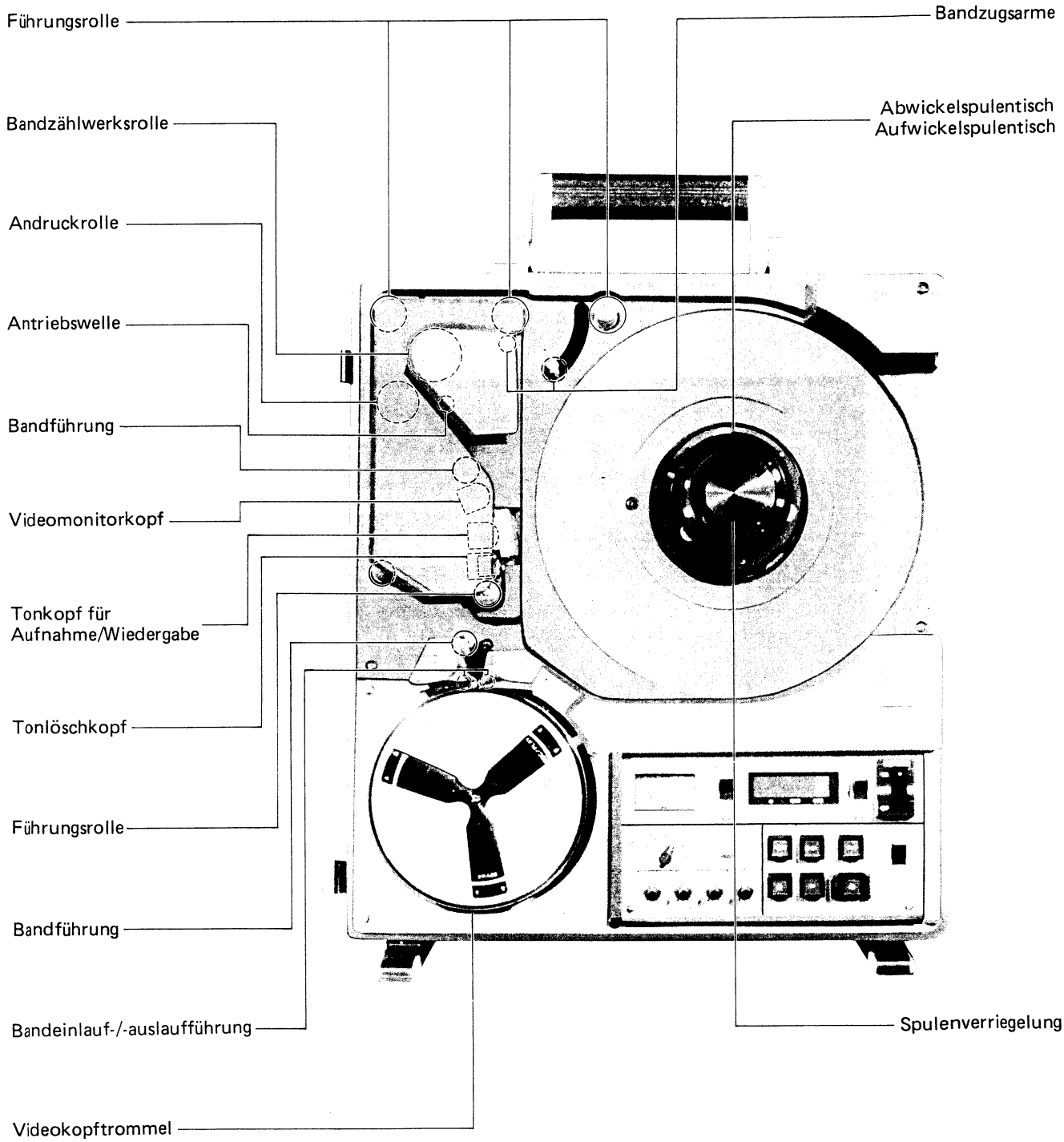
Frequenzgang	50 bis 15 000 Hz $^{+\frac{1}{3}}_{-\frac{5}{6}}$ dB (Kanal 1/2/3)	Wiedergabe mit BVH-1100PS
Signal-Rauschabstand	Besser als 56 dB (Kanal 1/2) (bei 3% Klirr) Besser als 50 dB (Kanal 3) (bei 3% Klirr)	
Klirrfaktor	Weniger als 1,2% (bei Betriebspegel)	
Übersprechen	Weniger als −60 dB (bei 1 kHz)	
Gleichlaufschwankungen	Weniger als 0,12% RMS	
Eingang	Direkteingang: 27 bis −22 dBm, 600 Ohm, symmetrisch Mikrofoneingang: −60 dBm, 600 Ohm, symmetrisch (−72 bis −20 dBs)	
Kopfhörerausgang	−30 bis −13 dB (regelbar)	

Zubehör	Leerspule Kameraersatzkabel

1-3. BESCHREIBUNG DER TEILE UND BEDIENUNGSELEMENTE



1-3-1. Bandtransport



1-3-2. Funktionsbedienungstafel

① Ein-Aus-Schalter [POWER ON/OFF]

② Stromversorgungs-Wahlschalter [POWER SELECT]

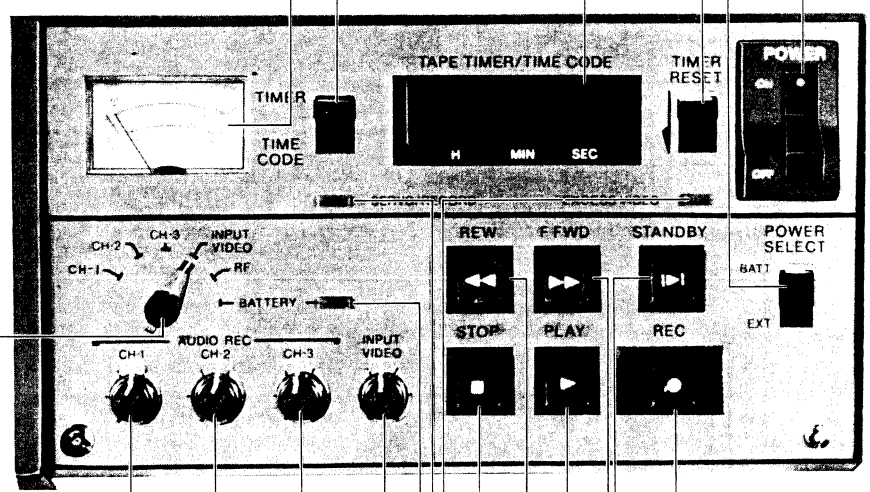
③ Bandzeit-/Zeitcode-Anzeige [TAPE TIMER/TIME CODE]

④ Bandzeit-/Zeitcode-Wahlschalter [TIMER/TIME CODE]

⑤ Bandzeit-Rückstellschalter [TIMER RESET]

⑥ Anzeigeinstrument [METER]

⑦ Anzeigeinstrument-/Kopfhörer-Wahlschalter [METER/PHONE]



⑧ Tonaufnahme-Pegelregler [AUDIO REC] (Kanal 1/2/3)

⑨ Videoeingangs-Pegelregler [INPUT VIDEO]

⑩ Servo-/Aufnahme-Warnanzeigelampe [SERVO/RECORD]

⑪ Videoübersteuerungs-Warnlampe [EXCESS VIDEO]

⑫ Batterie-Warnlampe [BATTERY]

⑬ Aufnahmetaste/-lampe [REC]

⑭ Vorlauftaste/-lampe [PLAY]

⑮ STOP-Taste/-lampe

⑯ Bereitschaftstaste/-lampe [STANDBY]

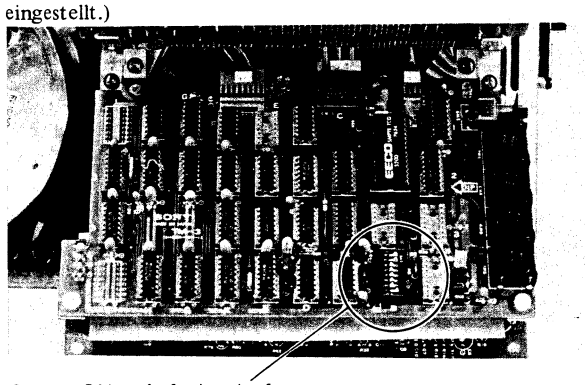
⑰ Schnellvorlauftaste/-lampe [F FWD]

⑱ Rückspultaste/-lampe [REW]

① **Ein-Aus-Schalter [POWER ON/OFF]**
Bei Stellung dieses Schalters auf ON leuchtet die STOP-Taste/-lampe auf, und das Video-Bandaufnahmegerät kann jetzt (aus der Stop/-Stellung) in Betrieb genommen werden. In der Stop/-Betriebsart verbraucht das Video-Bandaufnahmegerät 20 Mal weniger Strom als bei normalem Betriebszustand. Die Bandzeit-/Zeitcode-Anzeige [TAPE TIMER/TIME CODE] zeigt „TIMER" ohne Rücksicht auf die Stellung des Bandzeit-/Zeitcode-Wahlschalters [TIMER/TIME CODE]. Den Audio- und Videosystemen werden keine Signale zugeleitet.

② **Stromversorgungs-Wahlschalter [POWER SELECT]**
Dient zur Wahl der Stromversorgung.
EXT: Bei Anschluß eines Netzadapters (AC-500CE) an den Gleichstromeingangsanschluß [DC IN] der Anschlußplatte den Schalter auf diese Stellung bringen.
BATT: Nach Aufladen der eingesetzten Batterien den Schalter auf diese Stellung bringen. (Einzelheiten über das Aufladen der Batterien auf Seite 1-35.)
- Zwei vollaufgeladene Sony BP-90-Akkus reichen für ca. 90 Minuten fortlaufendes Aufzeichnen aus.
- Diesen Schalter bei Nichtgebrauch auf EXT stellen, damit die Batterien nicht übermäßig belastet werden. (Durch den Zeitcode-Speicherschaltkreis fließt ständig ein Strom von zwischen 300 und 400μA).

③ **Bandzeit-/Zeitcode-Anzeige [TAPE TIMER/TIME CODE]**
Diese digitale Flüssigkristallanzeige zeigt die Bandzeit oder den Zeitcode in Übereinstimmung mit der Stellung des Bandzeit-/Zeitcode-Wahlschalters [TIMER/TIME CODE] an. Bei Bandzeit-Anzeige wird die Anzahl der Umdrehungen der Bandzählwerksrolle im Bandtransportmechanismus gezählt und 4-stellig ($00_{MIN}00_{SEC}$) angezeigt. Positive Werte werden nicht gekennzeichnet, bei negativen Werten leuchtet jedoch das Zeichen „–" auf. Bei Zeitcode-Anzeige wird der Zeitcode des Zeitcode-Generators im Geräteinneren 6-stellig ($00_H00_{MIN}00_{SEC}$) angezeigt.
Der Zeitcode wird nur bei Aufnahme-/Bereitschaftsstellung und in keiner anderen Betriebsart angezeigt. Außerdem ist es durch entsprechendes Einstellen des DIP-Schalters auf der TM-3-Leiterplatte im Inneren möglich, zwischen Freilauf [FREE-RUN] zum Zählen ab Einschalten des Netzstroms ungeachtet der Betriebsart und Aufnahmelauf [REC-RUN] zum Zählen mit jedem Start zu wählen.
(Dieser Schalter ist werkseitig auf Freilauf [FREE-RUN] eingestellt.)



- Die Bandzeit-Anzeige wird nach Abschalten der Stromversorgung ungefähr eine Stunde lang gespeichert.
- Die Zeitcode-Anzeige bleibt nach dem Abschalten der Batteriestromversorgung für etwa fünf Minuten gespeichert. (Zum Betrieb siehe Abschnitt 1-7-5.)

④ **Bandzeit-/Zeitcode-Wahlschalter [TAPE TIMER/TIME CODE]**
Diesen Schalter verwenden, um die Bandzeit-/Zeitcode-Anzeige [TAPE TIMER/TIME CODE] zu wählen.
TIMER: Die Bandzeit wird angezeigt.
TIME CODE: Der Zeitcode wird angezeigt.
Der Zeitcode wird nur bei Einstellung des Videorekorders auf Aufnahme-/Bereitschaftsstellung angezeigt.

⑤ **Bandzeit-Rückstellschalter [TIMER RESET]**
Diesen Schalter verwenden, um die Bandzeit auf 00.00 zurückzustellen.
Einzelheiten über die Zeitcode-Voreinstellung sind im Abschnitt „Hilfsbedienungstafel 2" angegeben.

⑥ **Anzeigeinstrument [METER]**
Dieses Instrument zeigt die Batteriespannung, den Tonpegel, den Videoeingangspegel (Synchronimpulspegel) oder den HF-Pegel bei Aufnahme oder Wiedergabe an.
Mit dem Anzeigeinstrument-/Kopfhörer-Wahlschalter [METER/PHONE] wird die anzuzeigende Größe gewählt.

⑦ **Anzeigeinstrument-/Kopfhörer-Wahlschalter [METER/PHONE]**
Mit diesem Schalter kann der Eingang der Meßanzeige und der Monitorausgang (Kopfhörer) gewählt werden.
AUDIO CH-1/2/3: Der Aufnahme-/Wiedergabe-Tonpegel wird in VU angezeigt. Bei dieser Position liegen die Ausgangssignale des gewählten Kanals an der Kopfhörerbuchse [HEADPHONES] an.
INPUT VIDEO: Der an den Anschluß VIDEO IN (Videoeingang) oder CAMERA auf der Anschlußplatte angeschlossene Videoeingangspegel wird angezeigt.
RF: Der Wiedergabe-HF-Pegel des Videokopfes wird angezeigt.
BATTERY: Die Gleichstromspannung wird angezeigt. Bei Batteriebetrieb schlägt der Zeiger in den roten Bereich aus, wenn die Batteriespannung unter 11 V abfällt.
- Beim Ausgang an der Kopfhörerbuchse [HEADPHONES] handelt es sich um den Tonausgang von Kanal 1, wenn der Schalter auf INPUT VIDEO, RF oder BATTERY eingestellt wird.

⑧ **Tonaufnahme-Pegelregler [AUDIO REC] (Kanal 1/2/3)**
Den Anzeigeinstrument-/Kopfhörer-Wahlschalter [METER/PHONE] entweder auf AUDIO CH-1 (Tonkanal 1), AUDIO CH-2 (Tonkanal 2) oder AUDIO CH-3 (Tonkanal 3) stellen, und den Kanalregler so einstellen, daß der Zeiger des Meßinstrumentes bei Normalpegel auf 0 VU zeigt. (Der Wiedergabepegel kann nicht geregelt werden.)

⑨ **Videoeingangs-Pegelregler [INPUT VIDEO]**
Den Anzeigeinstrument-/Kopfhörer-Wahlschalter [METER/PHONE] auf INPUT VIDEO stellen, dann diesen Regler so einstellen, daß der Zeiger des Anzeigeinstrumentes auf die Mitte der blauen Zone zeigt.
- Gemäß obiger Beschreibung vorgehen und den Pegel einregeln, wenn das Synchronsignal als Servobezugssignal bei Wiedergabe an den Videoeingangsanschluß [VIDEO IN] auf der Anschlußtafel angeschlossen wird.

⑩ **Servo-/Aufnahme-Warnanzeigelampe [SERVO/RECORD]**
Diese Warnanzeigelampe leuchtet bei abgeschalteter Servoverriegelung in der Wiedergabe-Betriebsart oder bei Verschmutzung des Video-/Synchronkopfes in der Aufnahme-Betriebsart auf.

⑪ **Videoübersteuerungs-Warnlampe [EXCESS VIDEO]**
Diese Lampe leuchtet bei Zuleitung von Viedeoeingangssignalen auf, wo eine Gefahr der Übersteuerung gegeben ist. Wenn sie aufleuchtet, den Videoeingangspegel überprüfen.
Wenn das Anzeigeinstrument bei Umschaltung auf INPUT VIDEO normal anzeigt, liegt das Problem beim Videoeingangssignal. Einstellungen (Iris, Videopegel, Chrominanzpegel, Blende usw.) an der Kamera oder die Signalquelle überprüfen.

⑫ **Batterie-Warnlampe [BATTERY]**
Diese Lampe blinkt, wenn die Klemmenspannung der eingesetzten Batterien 11 V beträgt, und sie leuchtet stetig auf, wenn diese Spannung unter 10,8 V abfällt.

⑬ **Aufnahmetaste/-lampe [REC]**
Bei Niederdrücken dieser Taste zusammen mit der Vorlauftaste [PLAY] wird der Videorekorder auf Aufnahme geschaltet.
Bei Anschluß einer Kamera (Sony-BVP-Kamera) an den CAMERA-Anschluß auf der Anschlußplatte ist durch einen Befehl von der Kamera Fernbedienung (einschließlich Aufnahmebetrieb) möglich. (Siehe den Abschnitt „Ein-Aus-Schalter zum Rücksetzen-Schneiden [BACK SPACE EDIT]" auf der Anschlußplatte.)
- Bei Stellung des Ein-Aus-Schalters zur Aufnahmeprüfung/-blockierung [REC TEST/REC INHIBIT] auf REC TEST ON wird der Videorekorder auf Aufnahmeprüfung geschaltet. (Siehe Abschnitt „Hilfsbedienungstafel 1".)

Um den Aufnahmebetrieb des Videorekorders zu beenden, entweder die Stop-, Schnellvorlauf- oder Rückspultaste [STOP, F.FWD oder REW] niederdrücken. Bei Verwendung einer Kamera kann die Abschaltung wahlweise durch Fernbedienung erfolgen.

⑭ **Vorlauftaste/-lampe [PLAY]**
Bei Niederdrücken dieser Taste wird der Videorekorder auf normalen Wiedergabebetrieb geschaltet.
Sind ein Video-/Synchronsignal oder eine Kamera an den Videoeingangsanschluß [VIDEO IN] auf der Anschlußtafel angeschlossen, so wird der Wiedergabeservo mit diesen Signalen verriegelt. Wenn keine Signale zugeleitet werden, wird automatisch die innere Servoverriegelung gewählt.
Um den Wiedergabebetrieb zu beenden, entweder die Stop-, Schnellvorlauf- oder Rückspultaste [STOP, F.FWD oder REW] drücken.

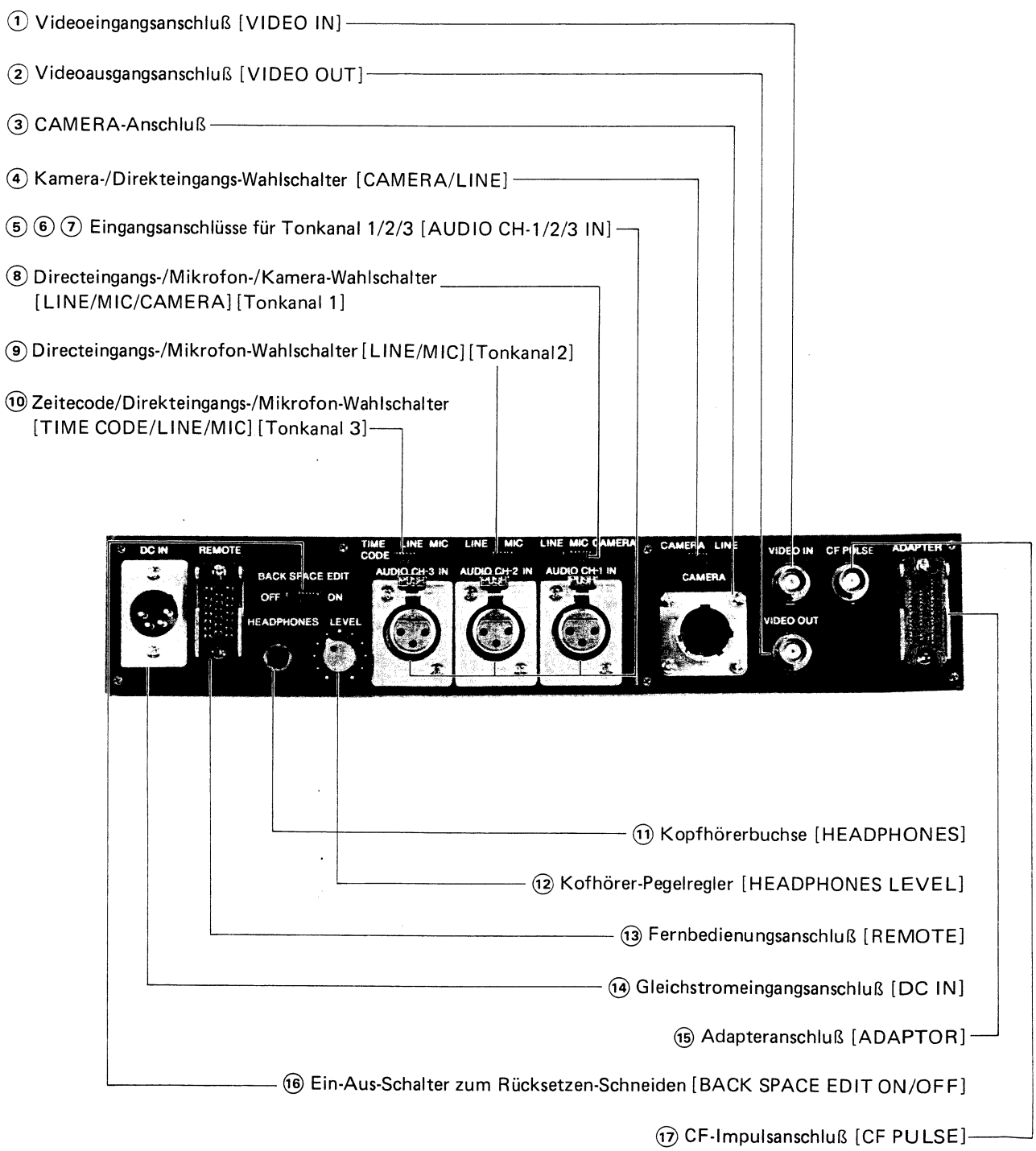
⑮ **STOP-Taste/-Lampe**
Durch Niederdrücken dieser Taste kann mit Ausnahme der Bereitschaftsstellung* und des Rücksetzen-Schneidens jede andere Betriebsart des Videorekorders ausgeschaltet werden. Der Spulenmotor wird mechanisch gestoppt, die Andruckrolle freigegeben und die Spulenbremse betätigt.
* Ein Niderdrücken dieser Taste in Bereitschaftsstellung werden die Audio- und Videosysteme auf EE gestellt.
Wird diese Taste bei ausgeschalteter Bereitschaft gedrückt, so wird der Videorekorder auf Stromsparschaltung 10 bis 15 Sekunden später gestellt (nur die STOP-Tastenlampe leuchtet auf). Bei automatischer Bandabschaltung vor Erreichen des Bandendes (bei Aufnahme, Wiedergabe oder Schnellvorlauf) wird der Bereitschaftsbetrieb des Videorekorders (bei ON) 10 bis 15 Sekunden später automatisch ausgeschaltet.
- Wenn das Band vom Bandtransportsystem gelöst ist (beim Zurückspulen usw.), wird es automatisch auf Stop geschaltet.

⑯ **Bereitschaftstaste/-lampe [STANDBY]**
Für das Anheben (Drehung) der Kopftrommel vorgesehen. Diese Taste durch Drücken auf ON stellen; durch nochmaliges Drücken wird sie ausgerastet.
Bei Normalbetrieb diese Taste drücken (ON) und den Videorekorder nach Anheben der Kopftrommel auf die gewünschte Betriebsart einstellen.

⑰ **Schnellvorlauftaste/-lampe [F.FWD]**
Bei Druck dieser Taste leuchtet die Lampe auf, und der Videorekorder wird auf Schnellvorlauf geschaltet. Um den Schnellvorlauf zu beenden, die Stop-, Vorlauf- oder Rückspultaste [STOP, PLAY oder REW] drücken.

⑱ **Rückspultaste/-lampe [REW]**
Bei Druck dieser Taste leuchtet die Lampe auf, und der Videorekorder wird auf Rücklauf geschaltet. Um den Rücklauf zu beenden, die Stop-, Vorlauf- oder Schnellvorlauftaste [STOP, PLAY oder F.FWD] drücken.

1-3-3. Anschlußplatte



① **Videoeingangsanschluß [VIDEO IN]**
BNC-Anschluß, Videosignalgemisch 1,0 V_{ss}, 75-Ohm-Ausgang
Die Videoeingangssignale können mit Hilfe des Kamera-Direkteingangs-Wahlschalters [CAMERA/LINE] wie folgt geschaltet werden:

Kamera-/Direkteingangs-Wahlschalter [CAMERA/LINE]
- CAMERA: Kameraeingang vom 14-poligen Kameraanschluß
- LINE: Eingang dieses Anschlusses (VIDEO IN)

Dieser Anschluß wird außerdem für das Wiedergabe-Servo-bezugssignal (Video/Synchronsignal) verwendet.

② **Videoausgangsanschluß [VIDEO OUT]**
BNC-Anschluß, 1,0 V_{ss}, 75 Ohm
Bei Verwendung als Monitoranschluß (Schwarzweiß) den Kontrollempfänger direkt anschließen. Wird eine Heterodyn-Einheit oder ein Time-Base-Corrector angeschlossen, ist Farbwiedergabe möglich. Zur Wiedegabesignalübertragung den Wiedergabeadapter/Time-Base-Corrector an den Adapteranschluß [ADAPTOR] ⑮ anschließen.

③ **CAMERA-Anschluß**
14-poliger Spezialanschluß
Eine Sony-BVP-Kamera an diesen Anschluß anschließen. Wird eine derartige Kamera angeschlossen, sind die Signale wie folgt;

MIC IN:	an den Kamerakopf angeschlossenes Mikrofoneingangssignal
VIDEO IN	Videoeingangssignal von der Kamera.
VIDEO OUT	Rücklaufvideosignal vom Videorekorder.
BATTERY ALARM:	Warnsignal für den Batteriezustand des Videorekorders über die Suchersignallampe.
REC TRIGGER:	Aufnahmestart- oder -stopbefehl für den Videorekorder.
CAMERA ALARM:	Warnsignal für Abschalten der Trommelverriegelung, Trommelblockierung des Videorekorders, Videoübersteuerung und Video-Konfidenz über die Signallampe (flackert). Stetiges Aufleuchten → Aufnahmebetrieb
CAMERA STANDBY:	Signale zum Ein- und Ausschalten der Videorekorder-Trommeldrehung. Rücklauftonsignale vom Videorekorder, überlagerte (gemischte) Tonsignale, können am Kamerakopf mitverfolgt werden.

④ **Kamera-/Direkteingangs-Wahlschalter [CAMERA/LINE]**
Diesen Schalter zur Wahl des Videoeinganges verwenden.
CAMERA: Für Eingangssignale vom CAMERA-Anschluß.
LINE: Für Eingangssignale vom Videoeingangsanschluß [VIDEO IN].

⑤

⑥ **Eingangsanschlüsse für Tonkanal 1/2/3 [AUDIO CH-1/2/3 IN]**

⑦ 3-polige XLR-Cannon-Anschlüsse
Eingangspegel und -impedanz hängen von den Stellungen der Schalter ⑧, ⑨ und ⑩ ab.

⑧ **Direkteingangs-/Mikrofon-/Kamera-Wahlschalter [LINE/MIC/CAMERA] (Tonkanal 1)**

⑨ **Direkteingangs-/Mikrofon-Wahlschalter [LINE/MIC] (Tonkanal 2)**

⑩ **Zeitcode/Direkteingangs-/Mikrofon-Wahlschalter [TIME CODE/LINE/MIC] (Tonkanal 3)**

CAMERA:	600 Ohm Impedanz, symmetrisch
LINE:	600 Ohm Impedanz, symmetrisch, +27 bis −20 dBm
MIC:	600 Ohm Impedanz, symmetrisch, −60 dBs (−72 bis −20 dBs)
TIME CODE:	Diese Stellung verwenden, um den Ausgang des eingebauten Zeitcodegenerators auf Tonkanal 3 aufzuzeichnen. (Der Pegel ist auf den Standardpegel voreingestellt.)

⑪ **Kopfhörerbuchse [HEADPHONES]**
Binaurale Buchse
Kopfhörer mit einer Impedanz von 8 Ohm bis 1 Kiloohm an diese Buchse anschließen. (Der Pegel ist regelbar.)
Mit Hilfe des Anzeigeinstrument-/Kopfhörer-Wahlschalters [METER/PHONE] die Tonkanäle 1, 2 oder 3 [AUDIO CH-1, CH-2 oder CH-3] wählen. (Weitere Einzelheiten sind im Abschnitt „Anzeigeinstrument-/Kopfhörer-Wahlschalter [METER/PHONE]" angegeben.) Wird ein Kopfhörer an diese Buchse angeschlossen, stehen die Ausgangssignale nicht mehr am Monitorausgang des Adapteranschlusses [ADAPTOR] zur Verfügung.

⑫ **Kofhörer-Pegelregler [HEADPHONES LEVEL]**
Diesen Regler verwenden, um den Pegel des an die Kopfhörerbuchse angeschlossenen Kopfhörers im Bereich von −30 dB bis −13 dB zu regeln.
Ist kein Kopfhörer an die Kopfhörerbuchse angeschlossen, kann der Monitorausgangspegel des Adapteranschlusses [ADAPTOR] geregelt werden.

⑬ **Fernbedienungsanschluß [REMOTE]**
20-poliger Spezialanschluß
Durch Anschließen der als Sonderzubehör erhältlichen Fernbedienungseinheit an diesen Anschluß kann der Videorekorder fernbedient werden. Fernbedienung von Aufnahme, Wiedergabe, Stop, Schnellvorlauf, Rücklauf und Bereitschaftsstellung ist möglich, und Kontrollampen, Anzeigeinstrument und Servolampe (Synchronisierung der Bandantriebswelle) sowie die +5 V-Signale (das eine ist von 15 bis 20 mA und das andere ist 200 mA max. auf Stromsparschaltung) stehen zur Verfügung. (Die Funktion basiert auf Parallelbetrieb.)

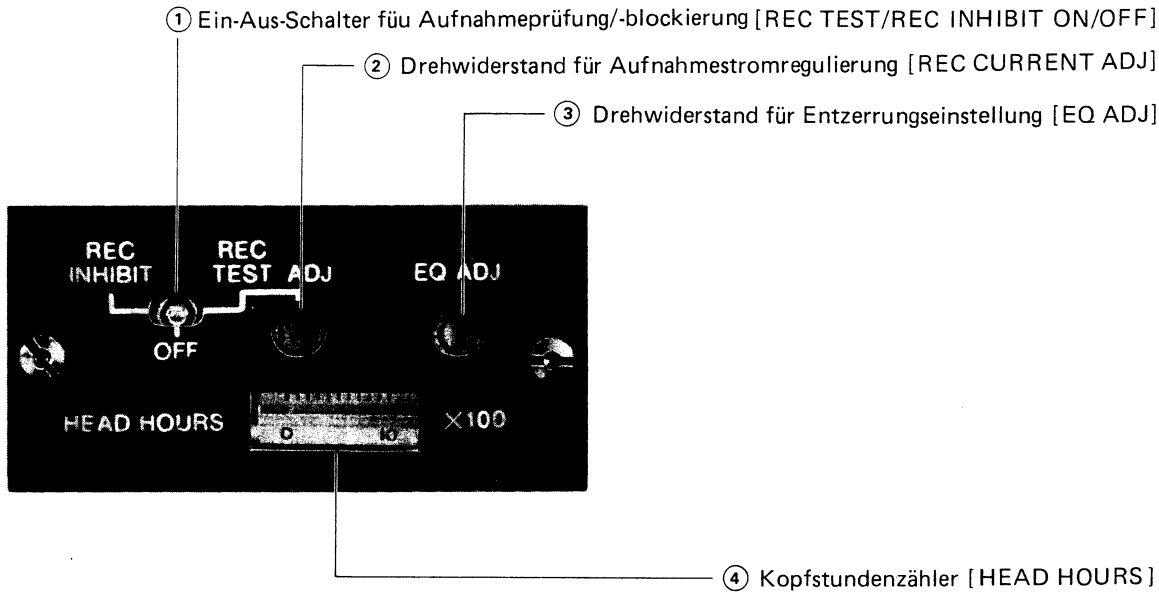
⑭ **Gleichstromeingangsanschluß [DC IN]**
4-poliger XLR-Cannon-Anschluß
Den als Sonderzubehör erhältlichen Netzadapter (AC-500) hier anschließen.
Den Stromversorgungs-Wahlschalter [POWER SOURCE] auf der Funktionsbedienungstafel verwenden, um Batterie- oder Außenstromversorgung zu wählen. (Kapazität: 12 V Gleichspannung, 6 bis 8 A)

⑮ **Adapteranschluß [ADAPTOR]**
24-poliger Spezialanschluß
Durch Anschließen des als Sonderzubehör erhältlichen PB-Adapters oder Time-Base-Correctors können Audio- und Videoeigenschaften erzielt werden, die denjenigen des BVH-1100PS entsprechen.

⑯ **Ein-Aus-Schalter zum Rücksetzen-Schneiden [BACK SPACE EDIT ON/OFF]**
Diesen Schalter verwenden, um normale Aufzeichnung oder Rücksetzen-Schneiden zu wählen.
ON: Für Kameraaufzeichnung
Das Band wird nach der Kameraaufzeichnung für ungefähr 4 Sekunden automatisch zurückgespult und stoppt. Bei Stellung [TRIGGER ON] wird das Band wiedergegeben (Servoverriegelung), so daß Anfügen möglich ist. Die Warnlampe von der Kamera hört mit dem flackern auf und leuchtet stetig auf.
Bei Drücken der STOP-Taste wird das Band für ungefähr 4 Sekunden automatisch zurückgespult und stoppt. Bei Druck der Tasten für Aufnahme [REC] und Vorlauf [PLAY] erfolgt nach 4 Sekunden (8 Sekunden bei Farbbetrieb) das Anfügen.
OFF: Kein Rücksetzen-Schneiden
Bei Druck der Tasten für Aufnahme [REC] und Vorlauf [PLAY] wird der Videorekorder auf Aufnahme geschaltet.

⑰ **CF-Impulsanschluß [CF PULSE]**
BNC-Anschluß, TTL-Pegel, 50% Einschaltdauer, negativer Rand Dieser
Dieser Eingangsanschluß für Aufnahme und Wiedergabe ist für die 6,25 Hz-Farbbildsteuerimpulse (Synchronsignale) vorgesehen. Bei Wiedergabe werden Farbbildsynchronsignale nur auf die CTS-Spur (auf dem Band) aufgezeichnet.

1-3-4. Hilfsbedienungstafel 1



① **Ein-Aus-Schalter für Aufnahmeprüfung/-blockierung [REC TEST/REC INHIBIT ON/OFF]**

REC TEST ON: Diesen Schalter verwenden, um den Aufnahmestrom des Videokopfes zu regulieren. Wenn bei dieser Schalterstellung die Tasten für Aufnahme [REC] und Vorlauf [PLAY] gedrückt werden, kann der Videorekorder in 0,8 bis 1,0 Sekunden-Intervallen alternierend auf Aufnahme und Wiedergabe geschaltet werden. Zum Einregeln den Anzeigeinstrument-/Kopfhörer-Wahlschalter [METER/PHONE] auf der Funktionsbedienungstafel auf RF (HF) stellen und den Drehwiderstand zur Aufnahmestromregulierung [REC CURRENT ADJ] so einstellen, daß der Zeiger maximal ausschlägt.
Die Aufnahmelampe [REC] blinkt beim Einregeln des Aufnahmestroms.
Bei Druck der Vorlauftaste [PLAY] wird der Videorekorder außerdem auf Stehbild-Betrieb geschaltet (die Lampe [PLAY] blinkt).
Wenn dieser Schalter nicht auf OFF gestellt wird, kann der Videorekorder auf keine andere Betriebsart (Vorlauf, Aufnahme, Schnellvorlauf, Rücklauf) außer der Stop-Stellung umgeschaltet werden.

- Wird dieser Schalter bei Stellung des Videorekorders auf Vorlauf-, Aufnahme-, Schnellvorlauf- oder Rückspul-Betrieb auf ON gestellt, erfolgt Umschaltung des Videorekorders auf Stop.

REC TEST OFF: Die Aufnahmestrom-Prüffunktion wird ausgeschaltet. (Der Videorekorder wird auf Stop gestellt.)

REC INHIBIT ON: Dieser Schalter verhindert ein Umschalten des Videorekorders auf Aufnahmebetrieb. Bei Wiedergabe sowie schnellem Vor- und Rücklauf eines bespielten Bandes sollte der Schalter daher auf diese Stellung gebracht werden.
(Der Aufnahmebefehl wird blockiert.)

REC INHIBIT OFF: Die Aufnahmeblockierungsfunktion ist ausgeschaltet.

② **Drehwiderstand für Aufnahmestromregulierung [REC CURRENT ADJ]**

Diesen Drehwiderstand verwenden, um den Aufnahmestrom des Video-/Synchronkanals des Videokopfes zu regulieren.

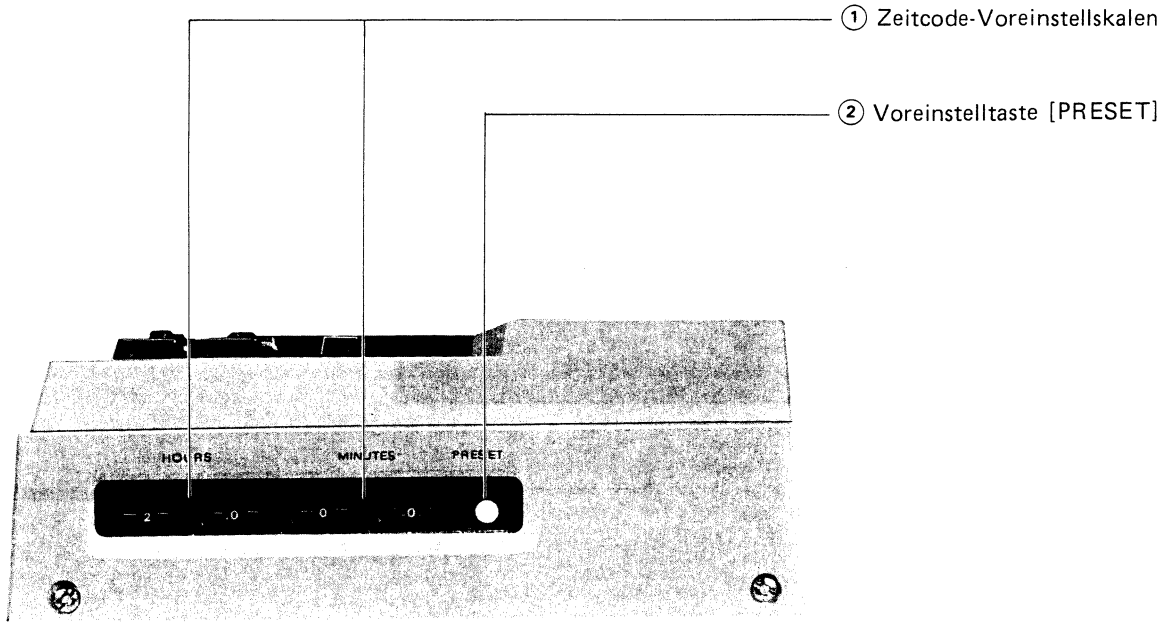
③ **Drehwiderstand für Entzerrungseinstellung [EQ ADJ]**

Mit diesem Drehwiderstand den Frequenzgang des Videosignals bei Wiedergabe ausgleichen.
Beim Anschließen des als Sonderzubehör erhältlichen Wiedergabeadapters und Time-Base-Correctors diesen Drehwiderstand auf den entsprechenden Wert einstellen.

④ **Kopfstundenzähler [HEAD HOURS]**

Stundenzähler mit einer Gesamtkapazität von 1 000 Stunden Dieser Zähler wird aktiviert, wenn sich die Trommel zu drehen beginnt, er zeigt die Betriebsstunden des Kopfes an.

1-3-5. Hilfsbedienungstafel 2

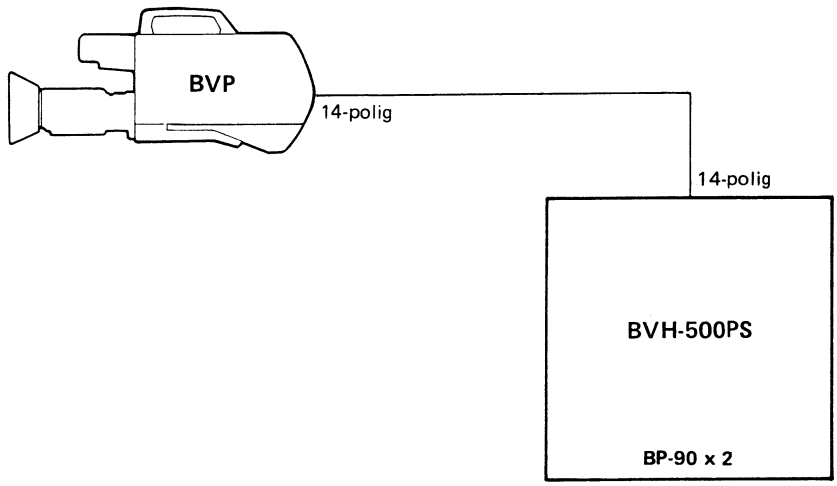


① **Zeitcode-Voreinstellskalen**
Diese Skalen zur Einstellung des Zeitcodes (00_H00_{MIN}) verwenden.
- Sekunde, Bildstellen 00.00
- Beim Aufzeichnen des Zeitcodes auf den Tonkanal 3 immer den Zeitcode-/Direkteingangs-/Mikrofon-Wahlschalter [TIME CODE/LINE/MIC] auf der Anschlußplatte auf TIME CODE stellen.

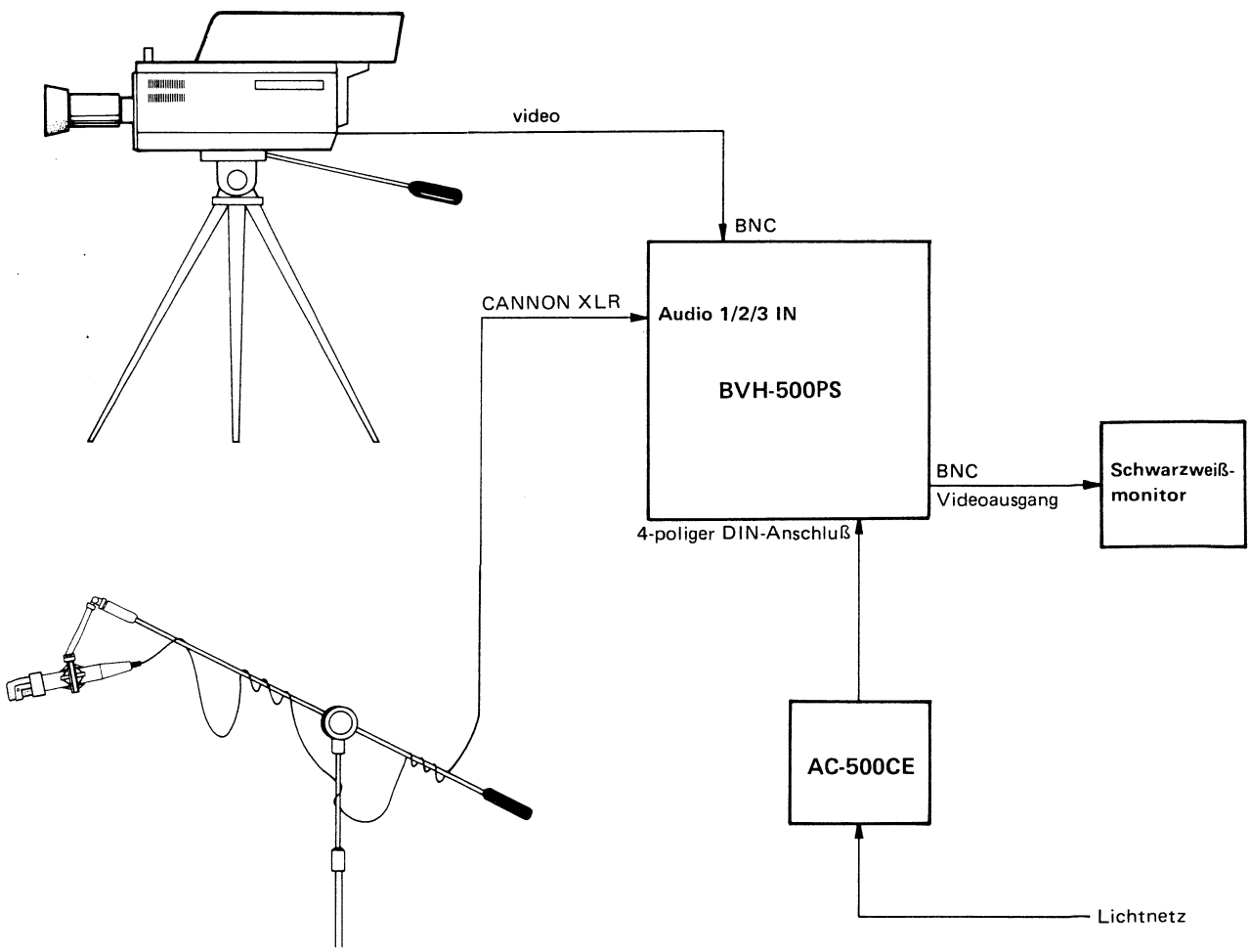
② **Voreinstelltaste [PRESET]**
Diese Taste niederdrücken, um mit dem Zeitcode zu beginnen, der mit Hilfe der Zeitcode-Einstellskalen eingestellt wurde.

1-4. ANSCHLÜSSE

1-4-1. Batteriebetrieb (im Freien)

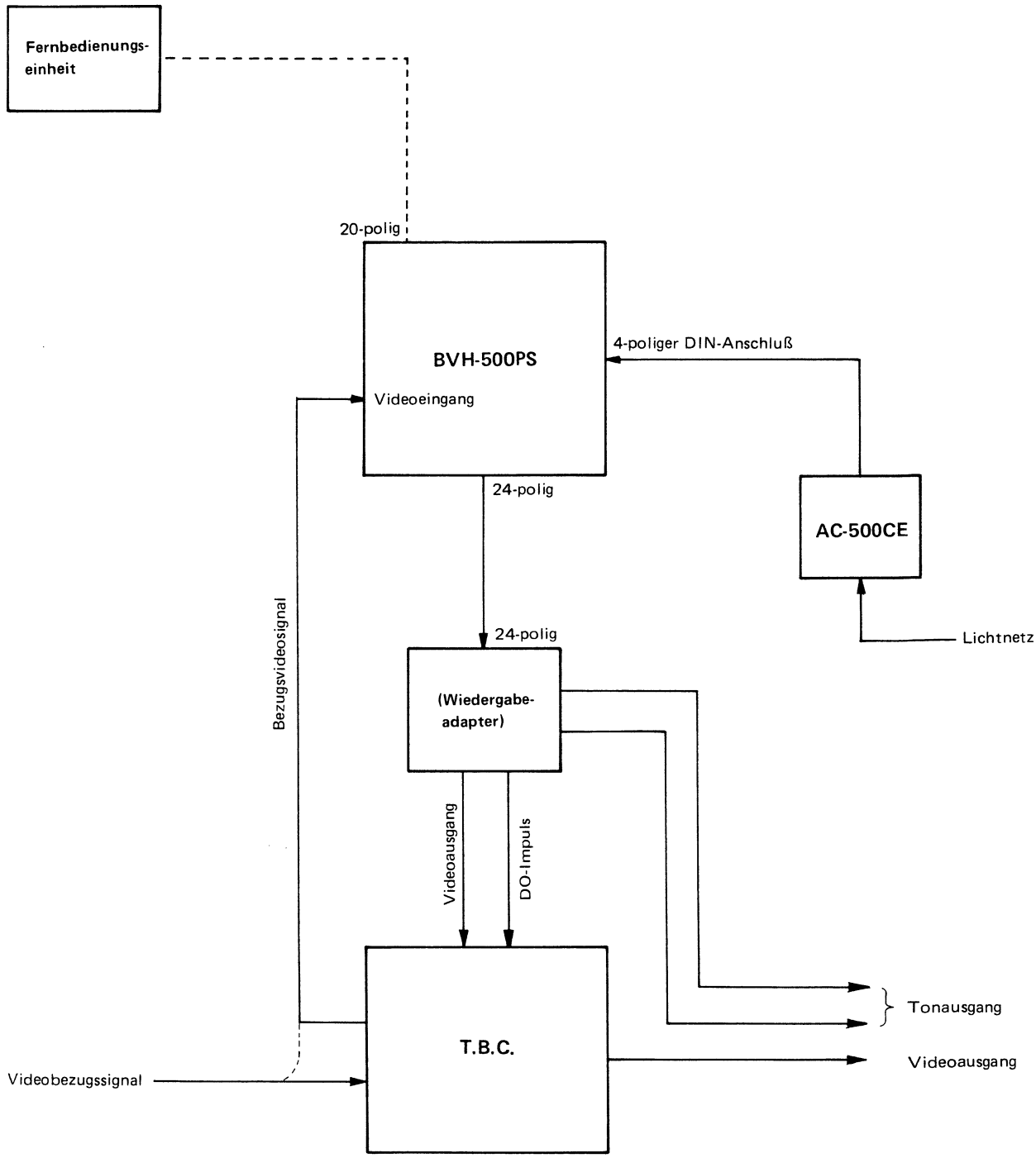


1-4-2. Netzbetrieb (im Studio)



1-4-3. Wiedergabe

Da Modell BVH-500PS besonders für Aufnahme gebaut wird, so wird Wiedergabe normalerweise mit Hilfe des BVH-1100PS ausgeführt.



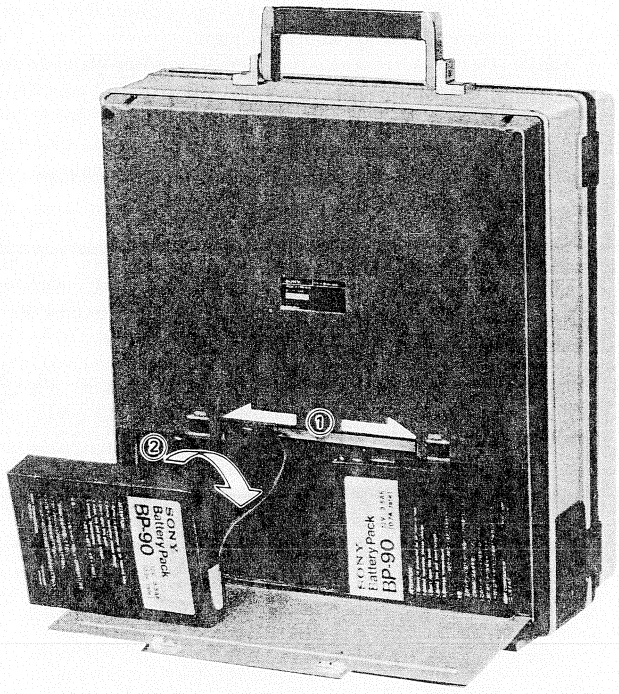
1-5. EINSETZEN DER BATTERIEN

1) Zwei Sony-BP-90-Akkus verwenden.

2) Nachprüfen, ob die Akkus ganz aufgeladen sind. (Ungleichmäßige Aufladung der beiden Akkus kann instabilen Betrieb verursachen und auch die Akkus beschädigen.)

3) Das Akkumagazin öffnen, die Akkus gemäß Abbildung in das Akkumagazin einlegen und den Stecker in die Buchse stecken.

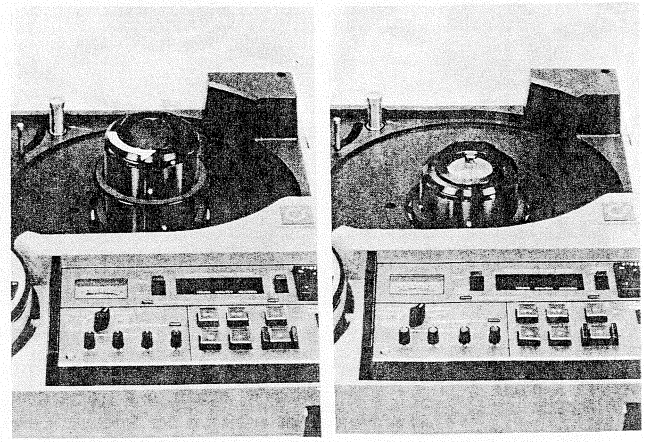
- Verwenden Sie nur Sony Akkus. Die Polarität des Akkusteckers kann je nach Hersteller verschieden sein.



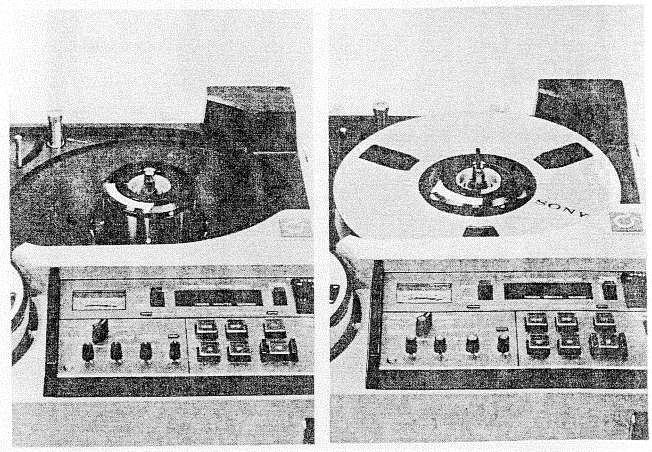
4) Das Akkumagazin schließen. Hiermit ist das Einsetzen der Akkus beendet.

1-6. LADEN DES BANDES

1) Die Spulenverrieglung des Aufwickelspulentisches entgegen dem Uhrzeigersinn drehen, mit den „grünen" und „roten" Markierungen ausrichten und den Aufwickelspulentisch abnehmen.



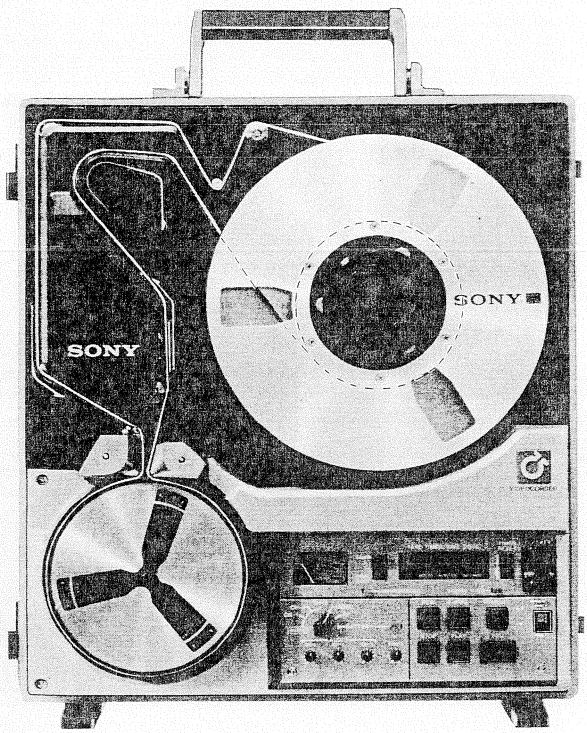
2) Die Spulenverriegelung des Abwickelspulentisches entgegen dem Uhrzeigersinn drehen und mit den „grünen" und „roten" Markierungen ausrichten. Danach die Bandspule auf den Abwickelspulentisch legen die drei Spulenschlitze über die drei Stifte des Spulentisches bringen, die Spulenverriegelung in entgegengesetzter Richtung (im Uhrzeigersinn) so weit drehen, bis die beiden „grünen" Markierungen aufeinander ausgerichtet sind und die Verriegelung sichern. Die Bandspule ist jetzt einwandfrei befestigt.)



3) Den Aufwickelspulentisch auf die Spulenachse setzen.
Dann die leere Spule auf den Aufwickelspulentisch legen, die Spulenverriegelung so weit im Uhrzeigersinn drehen, bis die „beiden grünen" Markierungen aufeinander ausgerichtet sind und die Verriegelung sichern. Die leere Spule (für das Band) ist jetzt einwandfrei befestigt.

- Beim Anbrirgen des Aufwickelspulentisches an der Spulenachse unbedingt darauf achten, diesen bis zum Anschlag einzusetzen. (Beim Drehen des Aufwickelspulentisches ist ein Klickgeräusch zu hören.)
- Für diesen Videorekorder zwei Spulen derselben Größe, zum Beispiel zwei 9-Zoll-Spulen, verwenden.

4) Das Band aus der Abwickelspule ziehen und nach dem Einfädeln gemäß Abbildung durch Drehen der Spule mit der Hand straffen.



1-7. BEDIENUNG

1-7-1. Vorbereitungen

1) Die Eingangs- und Ausgangskabelanschlüsse und den Batteriezustand (durch Blick auf die Warnlampen für Anzeigeinstrument [METER] und Batterien [BATTERY]) überprüfen.

2) Den Pegel der Video- und Toneingangsignale einstellen.
Nach Einstellen des Videorekorders auf Bereitschaftsbetrieb die STOP-Taste drücken und ihn auf EE-Betrieb stellen.
Video: Den Anzeigeinstrument-/Kopfhörer-Wahlschalter [METER/PHONE] auf INPUT VIDEO stellen, und den Videoeingangs-Pegelregler [INPUT VIDEO] so einstellen, daß der Zeiger des Anzeigeinstrumentes bis zur Mitte der blauen Zone ausschlägt.
Audio: Den Anzeigeinstrument-/Kopfhörer-Wahlschalter [METER/PHONE] auf AUDIO CH-1, CH-2 oder CH-3 (Tonkanal 1, 2 oder 3) stellen, und dann den entsprechenden Kanalregler so einstellen, daß der Zeiger des Anzeigeinstrumentes bei Normalpegel bis 0 VU ausschlägt.

3) Beim Aufzeichnen des Zeitoodes auf den Tonkanal 3 den Zeitcode-/Direkteingangs-/Mikrofon-Wahlschalter [TIME CODE/LINE/MIC] auf der Anschlußplatte auf TIME CODE einstellen. (Bei Einregelung des Pegels auf den Normalpegel braucht diese Einstellung nicht vorgenommen zu werden.)

4) Den Ein-Aus-Schalter zum Rücksetzen-Schneiden [BACK SPACE EDIT ON/OFF] entsprechend dem Verwendungszweck entweder auf ON oder OFF stellen.

1-7-2. Aufnahme

1) Den Ein-Aus-Schalter für Aufnahmeprüfung/-blockierung [REC TEST/REC INHIBIT ON/OFF] auf der Hilfsbedienungstafel 1 auf REC TEST stellen, und dann den Aufnahmestrom wie folgt einregeln.
   Zuerst die Tasten für Aufnahme [REC] und Vorlauf [PLAY] drücken, so daß der Videorekorder wiederholt in 0,8 bis 1,0 Sekunden-Intervallen abwechselnd auf Aufnahme und Wiedergabe geschaltet wird. (Dabei blinkt die Aufnahmelampe [REC].) Danach den Anzeigeinstrument-/Kopfhörer-Wahlschalter [METER/PHONE] auf RF (HF) stellen, und den Drehwiderstand für Aufnahmestromregulierung [REC CURRENT ADJ] so einregeln, daß der Zeiger des Anzeigeinstrumentes maximal ausschlägt.
   Nach Beendigung der Einstellung den Schalter auf REC TEST OFF stellen.

2) Die Bereitschaftstaste [STANDBY] niederdrücken, um die Kopftrommel anzuheben.

3) Die Tasten für Aufnahme [REC] und Vorlauf [PLAY] drücken, und den Videorekorder auf Aufnahmebetrieb zu schalten. (Der Bandlauf beginnt jetzt.) Bei Anschluß einer Sony-BVP-Kamera ist es möglich, den Videorekorder mittels Auslösesignal von der Kamera auf Aufnahmebetrieb zu stellen.
   Prüfen, daß die Warnlampen nicht aufleuchten.

4) Um den Aufnahmebetrieb zu beenden, die STOP-Taste des Videorekorders drücken, oder ein Auslösesignal von der Kamera zuleiten.

   - Wenn zwei oder mehrere Bedienungstasten (ausgenommen die Tasten [REC] und [STANDBY]) gleichzeitig gedrückt werden, wird einer von ihnen nach der folgenden Rangordnung Priorität gegeben.
     (1) STOP-Taste (Stop-Betriebsart)
     (2) PLAY-Taste (Wiedergabe)
     (3) F.FWD-Taste (Schnellvorlauf)
     (4) REW-Taste (Rücklauf)
   - Um im Farbbildsteuerungsbetrieb aufzunehmen, achten Sie darauf, das spezifizierte Signal an den CF-Impulssignal an der Anschlußplatte zu liefern.

1-7-3. Wiedergabe

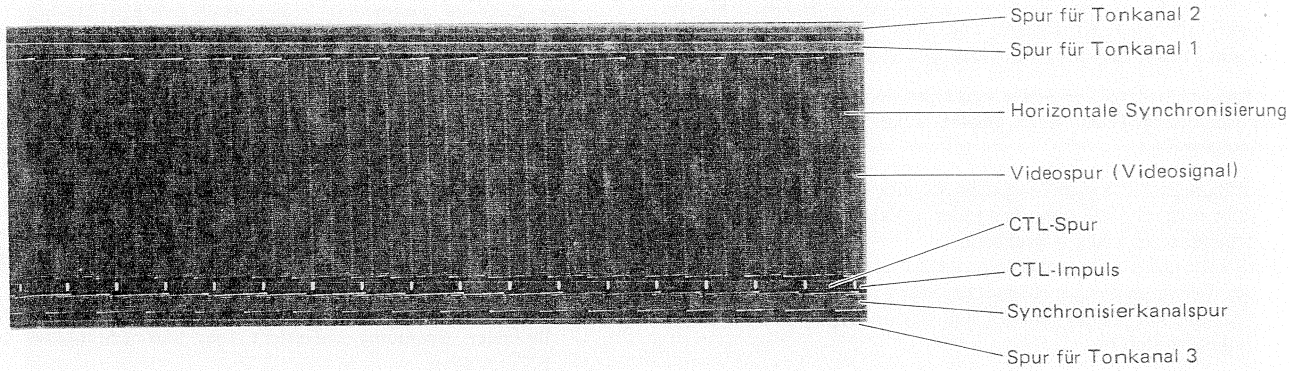
Die Anschlußplatte ist mit einem Videoausgangsanschluß [VIDEO OUT] ausgestattet; da dieses Modell jedoch speziell für Aufzeichnungen (Nachrichtensammlung) vorgesehen ist, wird für die Wiedergabe normalerweise Modell BVH-1100PS verwendet.

Wenn ein Farbmonitor an den Videoausgangsanschluß [VIDEO OUT] angeschlossen und die Vorlauftaste [PLAY] für Wiedergabe nur mit diesem Videorekorder (ohne Adapter) gedrückt wird, sind die Farbsignale nicht stabil, weil das Aufnahmesystem ein System für Direktaufzeichnungen im oberen Frequenzmodulationsbereich ist; die Bilder sind jedoch in Schwarzweiß einwandfrei.

Bei Wiedergabe den Ein-Aus-Schalter für Aufnahmeprüfung/-blockierung [REC TEST/REC INHIBIT ON/OFF] auf REC INHIBIT ON stellen. Dadurch wird verhindert, daß der Videorekorder durch falsche Bedienung auf Aufnahme geschaltet wird. Auf diese Weise ist es möglich, wichtige Nachrichten usw. gegen versehentliches Löschen zu schützen.

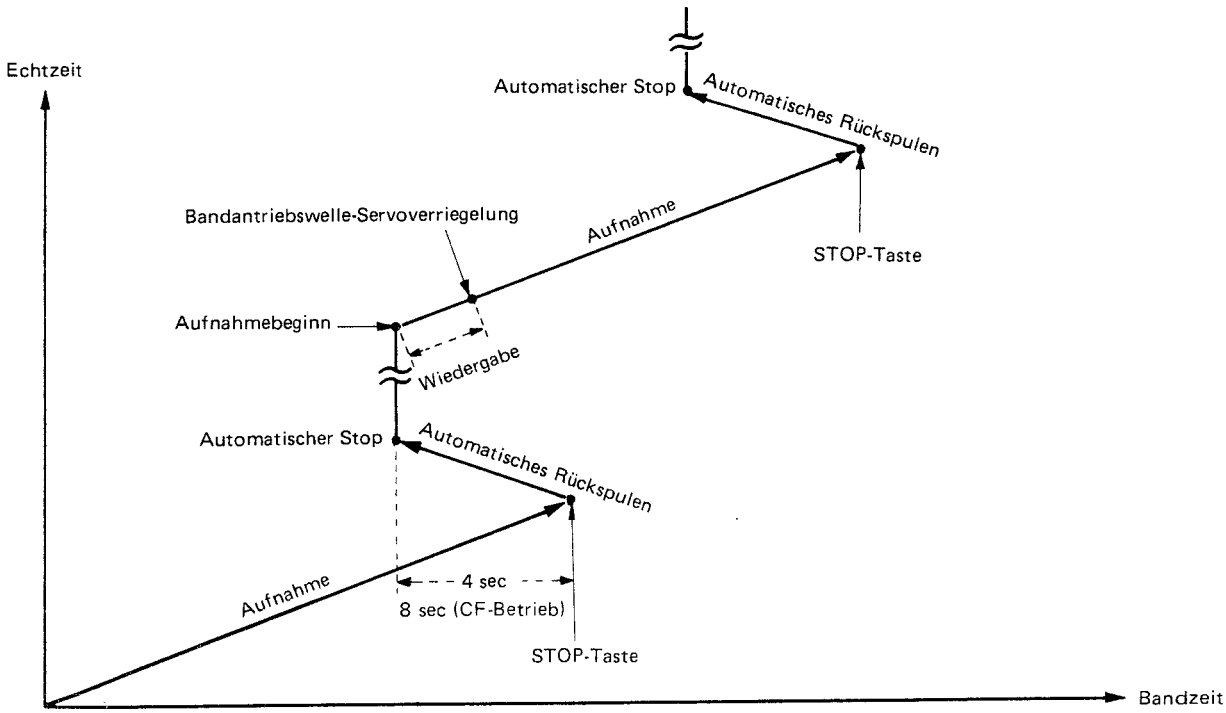
- Bei Wiedergabe ist es nicht möglich, den auf Tonkanal 3 aufgezeichneten Zeitcode anzuzeigen; der Bandzeit/Zeitcode-Wahlschalter [TAPE TIMER/TIME CODE] sollte daher auf TIMER gestellt werden.

Das mit diesem Videorekorder aufgezeichnete Spurmuster ist aus dem folgenden Foto ersichtlich.



1-7-4. Rücksetzen-Schneiden

Den Ein-Aus-Schalter zum Rücksetzen-Schneiden [BACK SPACE EDIT ON/OFF] auf ON stellen; die in der folgenden Abbildung gezeigten Vorgänge werden nach jeder Aufzeichnung wiederholt.



Wie aus der Abbildung hervorgeht, wird bei Druck der STOP-Taste oder Zuleitung eines Auslösesignals von der Kamera nach beendeter Aufnahme das Band automatisch 4 Sekunden lang zurückgespult und der Videorekorder automatisch gestoppt.

Wird jetzt der Befehl für Aufzeichnungsbeginn erteilt, wird der Videorekorder auf Wiedergabe und dann nach Verriegelung des Bandantriebswellen-Servos auf Aufnahme (Anfügen) geschaltet.

Mit anderen Worten; Die Bilder werden an den Übergängen zwischen aufgezeichneten Teilen nicht gestört, sondern aufeinanderfolgend zusammengefügt.

Die Rücksetzen-Schneiden-Funktion ist zum Anfügen vorgesehen; es ist nicht möglich, Bild oder Ton (oder beide) an bestimmten Stellen einer Bandaufzeichnung einzufügen.

- Bei Verwendung der Rücksetzen-Schneiden-Funktion wird der Zeitcode von Tonkanal 3 an den Verbindungsstellen für einige Teilbilder gestört.

1-7-5. Zeitcodespeicher

Bei auf OFF stehendem Ein/Aus-Schalter [POWER]

1) Wenn von den eingebauten Batterien (BP-90) oder einer externen Spannungsquelle (AC-500) Spannung anliegt, wird der Zeitcode gespeichert, selbst wenn der Ein/Aus-Schalter [POWER] des Gerätes auf OFF gestellt wird (bei unveränderter Stellung des Stromversorgungs-Wahlschalters [POWER SELECT]).

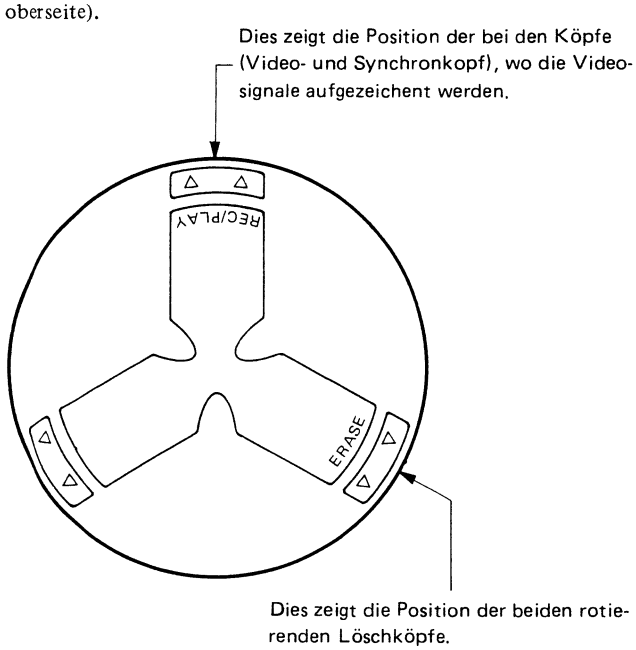
2) Wenn die Stromversorgung von den eingebauten Batterien (BP-90) oder der externen Spannungsquelle (AC-500) zeitweise unterbrochen wird, bleibt der Zeitcode unmittelbar danach für etwa 5 Minuten gespeichert.

- Um bei Nichtgebrauch des Gerätes eine übermäßige Belastung der Batterien zu vermeiden, den Wahlschalter [POWER SELECT] auf die Position, die nicht dem Wert der anliegenden Spannung entspricht (bei Batteriegebrauch auf EXT), stellen.

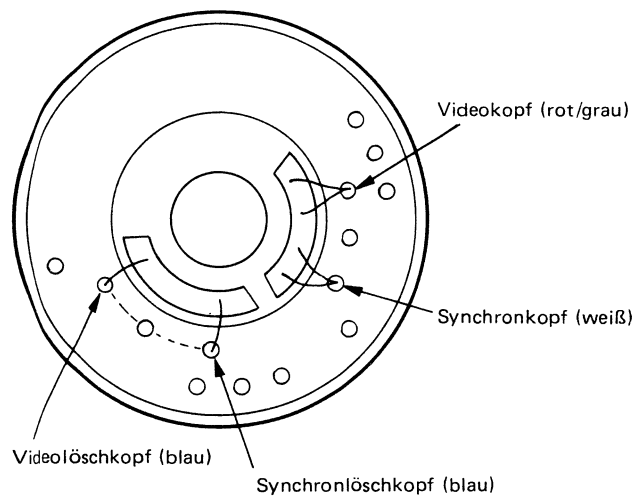
1-8. REGELMÄSSIGE WARTUNG

- Um Verschmutzung des rotierenden Kopfes zu verhindern, die Video- und Löschköpfe mit einem mit Freon oder Alkohol befeuchteten Stück Sämischleder abwischen.

Die folgende Abbildung zeigt die verschiedenen Köpfe (Trommeloberseite).



In der folgenden Abbildung wird die Position der Köpfe bei entferner Trommeloberseite gezeigt.

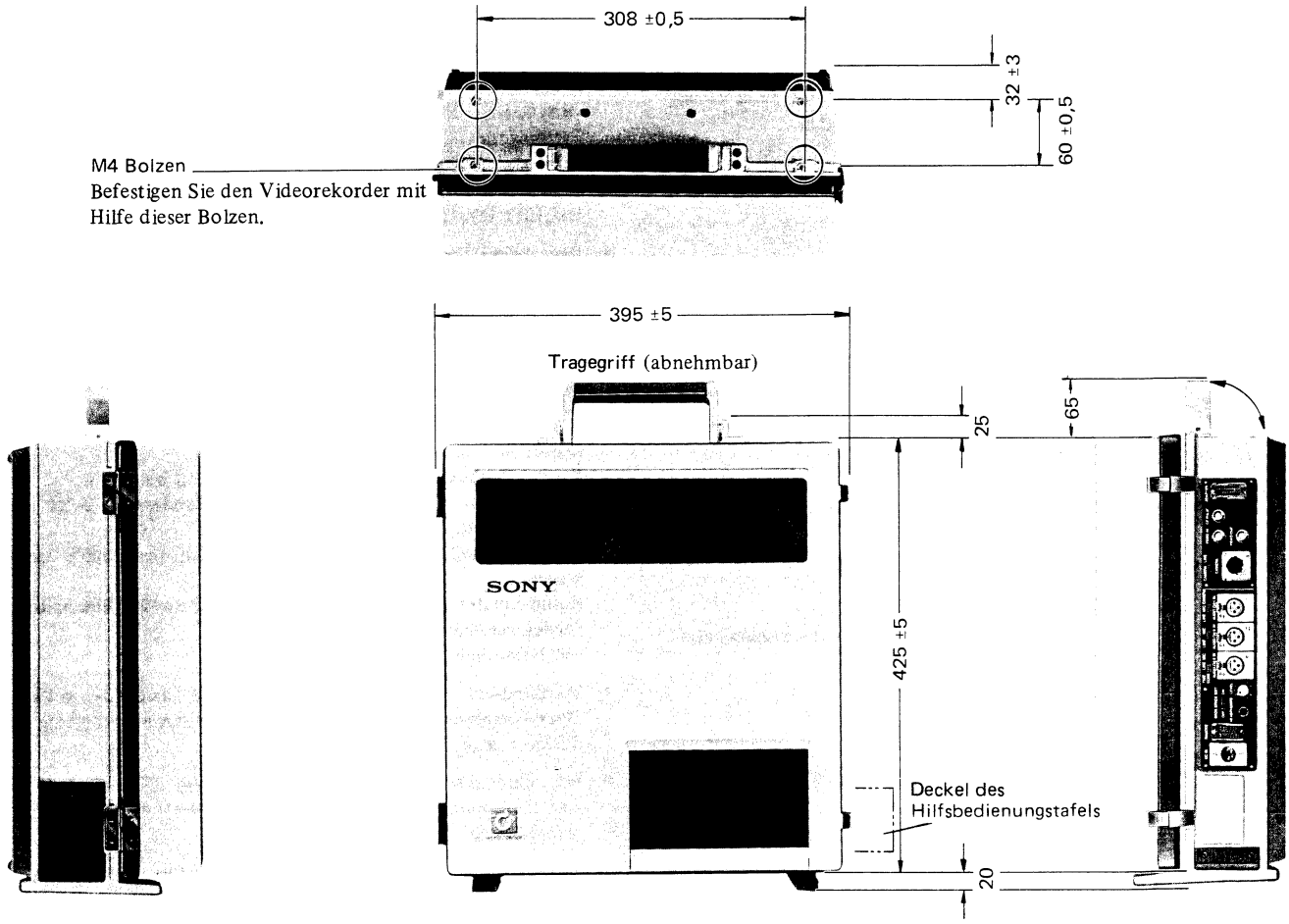


- Die Oberflächen der feststehenden Köpfe (Tonkopf für Aufnahme/Wiedergabe, Videomonitorkopf und Tonlöschkopf) immer sauberhalten.
- Außerdem die Bandführung und Führungsrollen, die mit dem Band in Berührung kommen, stets sauberhalten.

1-9. VORSICHTSMASSREGELN

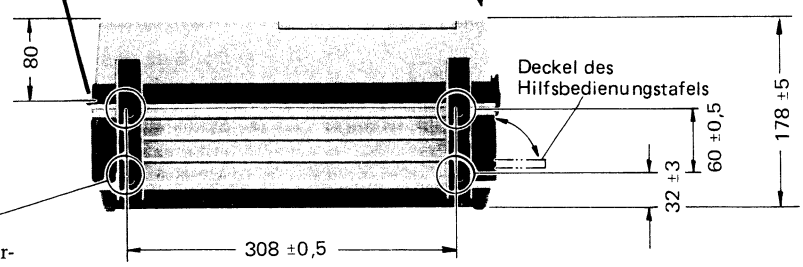
- Beim Aufzeichnen von Signalen von der Kamera die Einstellungen der Schalter auf der Anschlußplatte und den Eingangssignalpegel überprüfen.
  Zustund beim Laden des Bandes
  Stellung des Anzeigeinstrument-/Kopfhörer-Wahlschalters [METER/PHONE]
  Video- und Tonsignal-Eingangspegel
  Stellung des Ein-Aus-Schalters zum Rücksetzen-Schneiden [BACK SPACE ON/OFF]
  Stellung des Kamera-/Mikrofon-/Direkteingangs-/Zeitcode-Wahlschalters [CAMERA/MIC/LINE/TIME CODE]
  Stellung des Ein-Aus-Schalters für Aufnahmeblockierung [REC INHIBIT ON/OFF]
- Der Befehl für Aufzeichungsbeginn an der Kamera kann ohne Rücksicht auf die Betriebsarteneinstellung des Videorekorders erteilt werden.
  Daher sollte bei Wiedergabe eines bespielten Bandes usw. der Ein-Aus-Schalter für Aufnahmeprüfung/-blockierung [REC TEST/REC INHIBIT ON/OFF] auf REC INHIBIT ON gestellt und die Befehlsfunktion der Kamera abgeschaltet werden.
- Das Band vorsichtig handhaben.
  Die beschichtete Oberfläche des Bandes nicht berühren.
  Den Bandrand nicht falzen. Falls das Bandende gefalzt oder zerknittert ist, dieses abschneiden.
  Beim Einfädeln des Bandes darauf achten, dieses nicht umzubiegen.
  Keine Bänder mit großen Falten oder anderweitig beschädigten Stellen verwenden.
  Das Band nicht kleben.
- Bei Bandlauf nicht aus Versehen das Gerät ausschalten oder die Stromversorgung umschalten (von Außenstromversorgung auf Batteriestrom oder umgekehrt).
- Vor dem Anschließen oder Trennen von Geräten von der Anschlußplatte immer sicherstellen, daß der Videorekorder ausgeschaltet ist.
- Nachprüfen, ob die Batterien ganz aufgeladen sind, und immer zwei Batterien einsetzen.
- An den Trommeln kann sich Kondensat niederschlagen, wenn der Videorekorder von einem an einen anderen Platz bewegt wird und dabei ein schneller Temperaturwechsel auftritt. Bei starker Kondensatbildung kann es vorkommen, daß sich die Trommeln aufhören zu rotieren. In diesen Fall das Kondensat abwischen, oder die Trommeln trocknen lassen.
- An einem Platz, der starken Erschütterungen ausgesetzt ist, keine Aufnahme oder Wiedergabe durchführen.
- Den Videorekorder nicht an Orten verwenden, die direkter Sonneneinstrahlung, hohen Temperaturen oder hoher Feuchtigkeit ausgesetzt sind.
- Den Videorekorder nicht in die Nähe von starken magnetischen oder elektrischen Feldern bringen.
- Den Videorekorder bei Verwendung keinen starken Erschütterungen aussetzen.
- Die Batterien herausnehmen, wenn der Videorekorder längere Zeit nicht benutzt wird.
- Staub und Schmutz auf dem Gehäuse bzw. der Bedienungstafel mit einem trockenen weichen Tuch abwischen. Auf keinen Fall Alkohol, Benzin, Verdünner oder andere Chemikalien benutzen, da diese Substanzen die Gehäuseoberfläche angreifen und die Beschriftung entfernen.
- Wenn Verschmutzungen nicht mit einem trockenen weichen Tuch entfernt werden können, es mit einer mit Wasser verdünnten neutralen Reinigungslösung an feuchten. Anschließend die Reinigungsmittelrückstände mit einem trockenen Tuch abwischen.

1-10. FESTSTEHENDEN EINSATZ



Lassen Sie beim festen Einbau des Videorekorders auf der Seite der Anschlußplatte genügend Raum, damit das Vornehmen von Anschlüssen nicht behindert wird.

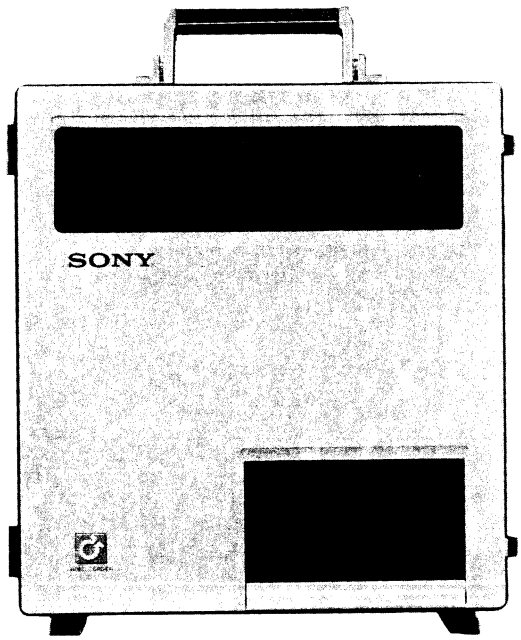
Öffnen sie die Abdeckung um mehr als 90 Grad, und schieben Sie sie zum Abnehmen nach oben.



SONY

MAGNETOSCOPE VIDEO PORTATIF

BVH-500PS



MODE D'EMPLOI ET D'ENTRETIEN

SECTION 1
FONCTIONNEMENT

1-1. CARACTERISTIQUES

Format U.E.R., type C

Le BVH-500PS est un magnétoscope vidéo portatif à enregistrement direct des gammes élevées FM, procédé PAL/SECAM 1 pouce, conçu tout spécialement pour être une version sœur du Magnétoscope Sony BVH-1100PS. Il y a complète compatibilité entre ces deux appareils et on utilise le même type et format de bande UER (type C, UER).

Taille réduite et poids léger

Le système de bobine superposable est conçu pour améliorer le facteur espace, le châssis est en alliage d'aluminium, le coffret de l'appareil est d'un seul tenant, et le tambour de tête est directement couplé au moteur plat. Tout ceci forme un ensemble compact et d'un poids très léger.

Montage d'un espacement arrière automatique (sélectionnable)

Cette caractéristique permet le montage d'assemblage avec des passages d'une scène à l'autre très doux. Le mécanisme fonctionne comme suit: rembobinage quelques secondes après enregistrement ⟶ arrêt (attente) ⟶ déclenchement d'enregistrement ⟶ lecture ⟶ verrouillage servo ⟶ enregistrement. Toutes ces actions se font automatiquement.

Système servo numérique

On utilise un système servo numérique qui permet à une courbe servo de haute définition d'être incorporée pendant l'enregistrement/lecture.

Ce circuit élimine l'instabilité produite par des erreurs d'amplitude transitoires élevées, ce qui est souvent un problème avec les systèmes de contrôle numérique, et il transmet également la détection des erreurs sous une forme non linéaire pour minimiser effectivement les effets des erreurs gyroscopiques, des changements d'environnement et des dérivations à long terme.

Système de servo tension électronique

Ce circuit de phase particulier a deux fonctions: il détecte effectivement la vitesse de rotation de la bobine et applique une torsion arrière sur le moteur de la bobine débitrice qui est proportionnelle au diamètre de la bobine, ce qui élimine les fluctuations de tension statique; il renvoie également les fluctuations de grande vitesse qui en découlent vers une phase inverse, ce qui permet d'obtenir un degré de stabilité de tension hautement précis.

Caractéristiques anti-roulis

Le servo tension rehausse les caractéristiques anti-roulis.

Systèmes d'alarme

Alarme de batterie: Quand le niveau de tension d'une batterie interne tombe au-dessous du niveau d'utilisation déterminé par la courbe de décharge de la batterie, le voyant d'alarme clignote et reste allumé, indiquant que le niveau est trop bas.

Alarme de signal d'obstruction de la tête et alarme servo: Pendant l'enregistrement ou le verrouillage servo, une tête vidéo stationnaire contrôle le signal de synchronisation enregistré et envoie des signaux d'alarme si la tête est obstruée s'il y a déverrouillage servo, ou s'il y a des défauts d'enregistrement (alarmes servo et d'enregistrement).

Alarme de signal de surmodulation: Il contrôle le niveau de crête vidéo et fournit un signal d'alarme quand sa valeur atteint un niveau critique (alarme d'excès vidéo).

Circuits de protection

Circuit de détection de fin de bande: Ce circuit détecte la quantité de bande qui reste sur la bobine. La bande s'arrête quand la quantité de bande restante atteint un certain niveau. Ce circuit fonctionne dans les modes d'avance rapide, d'enregistrement et de lecture.

Circuit de détection de la rotation du tambour: Il est activé quand de la condensation se forme sur le tambour et sa rotation est alors arrêtée. (Ceci évite les pertes de puissance.)

Circuit de détection des cheminements irréguliers de la bande: Il arrête l'appareil quand le mouvement de la bande ne reprend pas une vitesse normale après un temps déterminé, parce que la bande plisse ou parce qu'elle est endommagée.

Générateur incorporé de code de temps UER

Ce code de temps UER peut être enregistré en même temps qu'un autre matériel sur le canal audio CH-3 pendant l'enregistrement. En utilisant le sélecteur interne, il est possible de placer le code de temps sur REC-RUN ou sur FREE-RUN.

Réglage du courant d'enregistrement

On peut facilement et rapidement régler le meilleur courant d'enregistrement.

Consommation faible

Des circuits intégrés C-MOS dans le circuit de commande logique, des régulateurs de commutation à haute efficacité, une réduction de courant en mode d'attente, un moteur sans noyau hautement efficace, tout ceci permet de réduire la consommation à un absolu minimum.

Durée d'enregistrement longue

Il est possible de procéder à un enregistrement continu pendant 60 minutes sans changer les bandes avec une seule bobine de bande Sony V-16 à haute densité (bobine de 9 pouces).

Autres caractéristiques importantes

Touches de commande logique à auto allumage pour une identification de contrôle positive; un affichage numérique à cristal liquide pour une consommation faible; des connecteurs de sortie de lecture pour un contrôle noir et blanc et un coffret anti-poussière, imperméable pour permettre un fonctionnement précis sous les pires conditions. Toutes ces caractéristiques facilitent le fonctionnement de l'appareil, lui permettent d'être portatif et en font un appareil extrêmement fiable.

1-2. SPECIFICATIONS

Alimentation	12 V courant continu
Consommation	56 W
Température de fonctionnement	0°C à 40°C
Humidité	10% à 90% (sans condensation)
Dimensions	Se reporter au chapitre "UTILISATION STATIQUE".
Poids	Env. 22 kg (y compris les batteries, la bande et les bobines)
Système d'enregistrement	Gamme élevée FM directe
Vitesse de bande	23,98 cm/sec.
Vitesse d'écriture (vitesse relative)	21,39 m/sec.
Durée d'enregistrement/ lecture	63 mn. (avec bobine de 9 pouces)
Durée de rembobinage	Env. 4,5 mn. (avec bobine de 9 pouces)
Durée de verrouillage	Moins de 3,5 secondes (mode d'attente)
Position de fonctionnement	Horizontale ou verticale
Bandes recommandées	Bande Sony 1 pouce à haute densité (série V-16) ou équivalent
Dimension des bobines	8 , 9 , 9,25 , 9,5 pouces
Temps de la bande	99 minutes, 59 secondes
Capacité des batteries	90 minutes (en utilisant les deux batteries Sony BP-90 pleinement chargées)

Vidéo

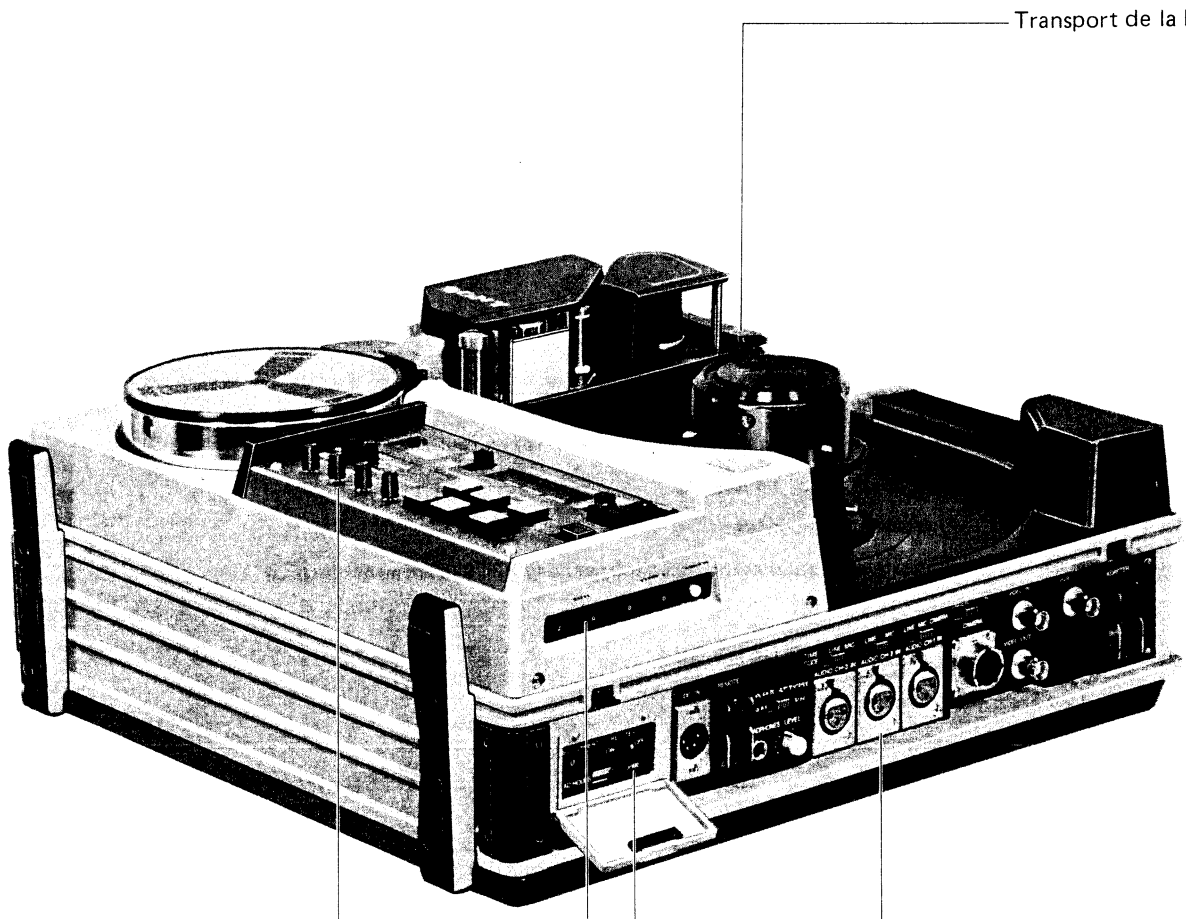
Longueur d'ondes	5,5 MHz ±0,5 dB, 6 MHz −3 dB	Lecture sur le BVH-1100PS
Rapport signal sur bruit	Supérieur à 43 dB	
Gain différentiel	Inférieur à 4%	
Phase différentielle	Inférieure à 4°	
Réponse transitoire	Inférieure à 1% (pulsation 2T)	
Moirage	Inférieur à −35 dB (barre couleur 75%)	
Délai de chrominance	Moins de 25 n sec.	
Entrée	1,0 Vc.-c., 75 ohms	
Sortie moniteur	1,0 Vc.-c., 75 ohms (couleur instable)	
Entrée impulsions CF	6,25 Hz, 50% utilisation TTL (pour image couleur servo)	

Audio

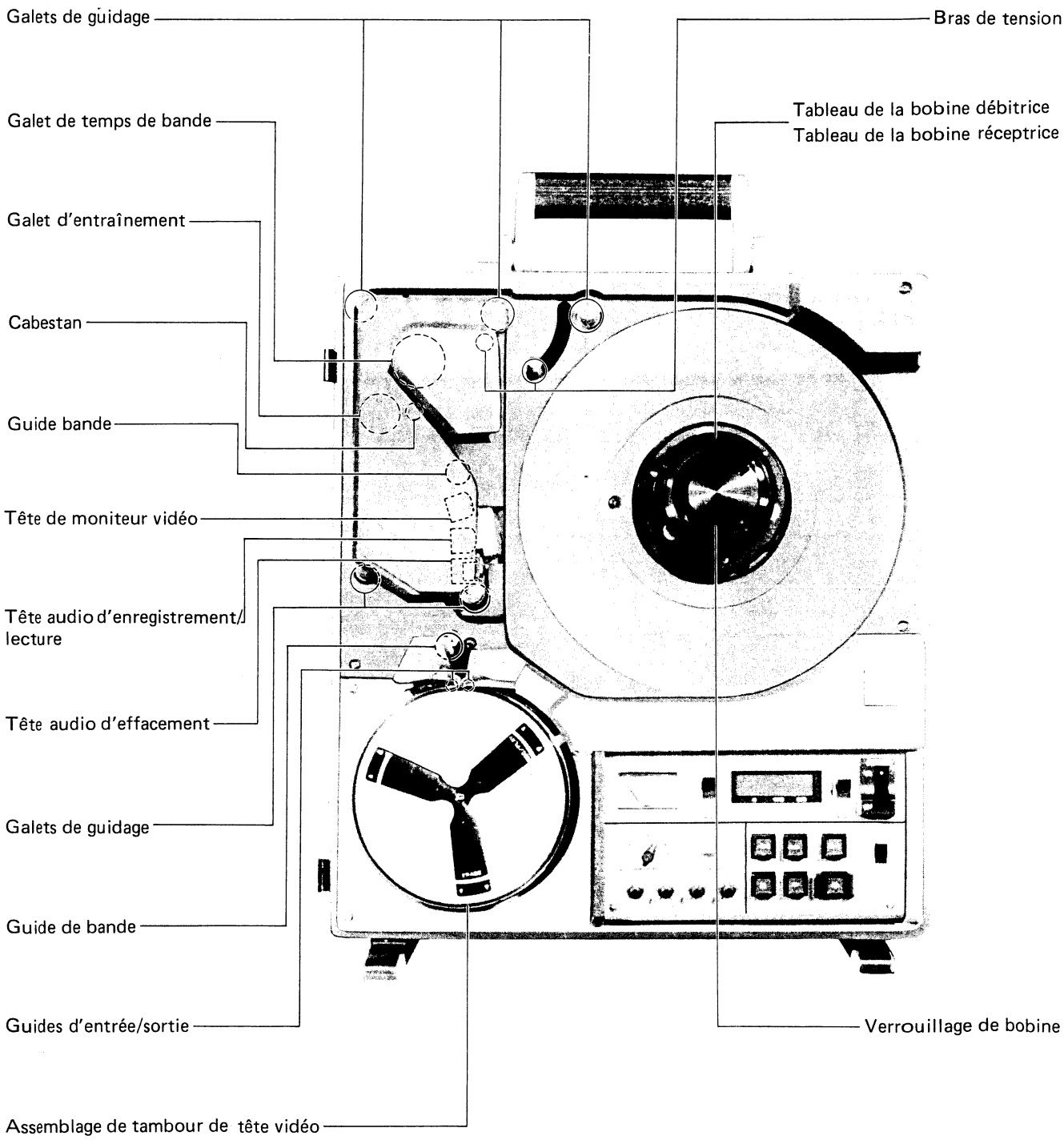
Réponse en fréquence	50 à 15 000 Hz $^{+\frac{1}{3}}_{-5}$ dB (CH-1/2/3)	Lecture sur le BVH-1100PS
Rapport signal sur bruit	Supérieur à 56 dB (CH-1/2) (à un niveau de distorsion de 3%) Supérieur à 50 dB (CH-3) (à un niveau de distorsion de 3%)	
Distorsion	Inférieure à 1,2% (niveau de fonctionnement)	
Diaphonie	Inférieure à −60 dB (à 1 kHz)	
Pleurage et scintillement	Inférieur à 0,12% RMS	
Entrée	Ligne: 27 à −22 dBm, 600 ohms, équilibrée Mic: −60 dBm, 600 ohms, équilibrée (−72 à −20 dBs)	
Sortie casque	−30 à −13 dB (réglable)	

Accessoires	Bobine vide Câble de rechange de caméra

1-3. DESCRIPTION DES ELEMENTS ET DES COMMANDES



1-3-1. Transport de la bande



1-3-2. Panneau des commandes de fonction

① Interrupteur d'alimentation [POWER ON/OFF]

② Sélecteur de source d'alimentation [POWER SOURCE]

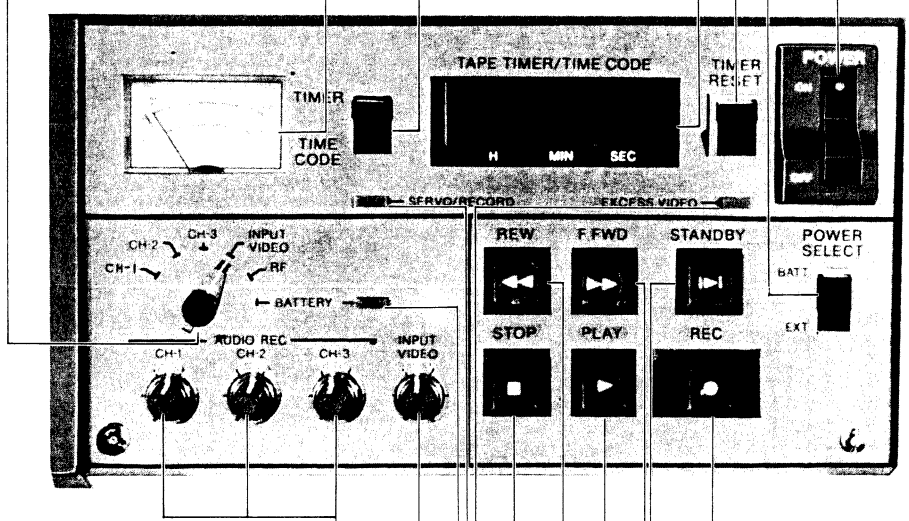
③ Cadran de temps de bande/code de temps [TAPE TIMER/TIME CODE]

④ Sélecteur de temps de bande/code de temps [TAPE TIMER/TIME CODE]

⑤ Interrupteur de remise à zéro du temps de bande [TAPE TIMER]

⑥ Indicateur [METER]

⑦ Sélecteur d'indicateur et de casque [METER/PHONE]



⑧ Réglages de niveau d'enregistrement audio [AUDIO REC] (CH-1/2/3)

⑨ Réglage de niveau d'entrée vidéo [INPUT VIDEO]

⑩ Voyant d'alarme [SERVO/RECORD]

⑪ Voyant d'alarme des signaux vidéo excessifs [EXCESS VIDEO]

⑫ Voyant d'alarme des batteries [BATTERY]

⑬ Touche/voyant d'enregistrement [REC]

⑭ Touche/voyant de lecture [PLAY]

⑮ Touche/voyant d'arrêt [STOP]

⑯ Touche/voyant d'attente [STANDBY]

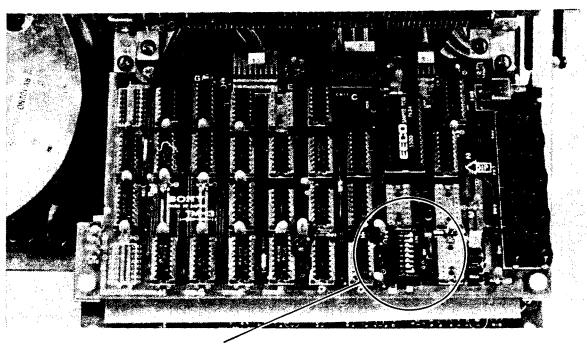
⑰ Touche/voyant d'avance rapide [F.FWD]

⑱ Touche/voyant de rembobinage [REW]

① **Interrupteur d'alimentation [POWER ON/OFF]**
Quand il est placé sur ON, la touche/voyant [STOP] s'allume et il est alors possible de faire fonctionner le magnétoscope (à partir du mode d'arrêt). Dans le mode d'arrêt, le magnétoscope consomme 20 fois moins de courant que dans les conditions de fonctionnement normales. Le cadran de temps de bande/code de temps [TAPE TIMER/TIME CODE] affiche "TIMER" quelle que soit la position du sélecteur [TAPE TIMER/TIME CODE]. Aucun signal n'est fourni aux systèmes audio et vidéo.

② **Sélecteur de source d'alimentation [POWER SOURCE]**
L'utiliser pour choisir la source d'alimentation.
EXT: Le mettre sur cette position quand on a connecté un adaptateur d'alimentation (AC-500CE) au connecteur [DC IN] du panneau de connexions.
BATT: Le mettre sur cette position quand les batteries internes ont été mises en place. (Se reporter page 1-55 pour le processus de mise en place des batteries.)
- Deux batteries Sony BP-90 pleinement chargées fournissent environ 90 mn. d'enregistrement continu.
- Mettre cet interrupteur sur EXT de sorte qu'il n'y ait pas de d'intensité excessive sur les piles quand elles ne sont pas utilisées. (Un courant de 300 à 400μA passe constamment au travers du circuit mémoire du code temps).

③ **Cadran de temps de bande/code de temps [TAPE TIMER/TIME CODE]**
Ce cadran numérique à cristal liquide indique le temps de la bande ou le code de temps en accordance avec la position du sélecteur [TAPE TIMER/TIMER CODE]. Pour l'affichage du temps de bande, le nombre de rotations de la roue du temps de bande dans le mécanisme du transport de la bande est comptabilisé puis affiché en 4 chiffres ($00_{MIN}00_{SEC}$). Les valeurs positives ne sont pas indiquées mais pour les valeurs négatives, la marque "–" s'allume. Lors de l'affichage du code de temps, le code de temps du générateur de code de temps intérieur est indiqué par 6 chiffres ($00_{H}00_{MIN}00_{SEC}$).
Les codes de temps ne sont indiqués que lors du mode d'enregistrement/attente. En choisissant l'interrupteur [DIP] sur le panneau de circuit TM-3 interne, il est possible de choisir entre marche-libre(FREE–RUN) pour une comptabilité à partir de la mise sous tension sans considération du mode, ou marche-enregistrement (REC-RUN) pour comptabiliser également chaque départ. (Cet interrupteur est placé sur FREE-RUN en usine.)



6 ——►ON: marche-enregistrement
6 ——►OFF: marche-libre

- L'affichage du temps de bande est conservé dans la mémoire pendant environ une heure après coupure de l'alimentation.
- L'affichage du code temps est conservé dans la mémoire pendant environ cinq minutes après que l'alimentation par piles ait été coupée. (Voir la section 1-7-5 pour le fonctionnement.)

④ **Sélecteur de temps de bande/code de temps [TAPE TIMER/TIME CODE]**
L'utiliser pour choisir le cadran [TAPE TIMER/TIME CODE].
TIMER: Le temps de la bande est affiché.
TIME CODE: Le code de temps est affiché.
Le code de temps n'est affiché que quand le magnétoscope est en mode d'enregistrement/attente.

⑤ **Interrupteur de remise à zéro du temps de bande [TAPE TIMER]**
L'utiliser pour remettre le temps de la bande sur 00.00.
Pour le préréglage du code de temps, se reporter au paragraphe "Panneau de sous-contrôle-2".

⑥ **Indicateur [METER]**
Il indique la tension des batteries, le niveau audio, le niveau d'entrée vidéo (niveau de synchronisation) ou le niveau RF pendant l'enregistrement ou la lecture.
Le sélecteur [METER/PHONE] choisit la quantité qui doit être affichée.

⑦ **Sélecteur d'indicateur et de casque [METER/PHONE]**
Il choisit l'entrée à l'affichage de l'indicateur et la sortie du moniteur (casque).
AUDIO CH-1/2/3: Le niveau audio d'enregistrement/lecture est affiché en VU. En choisissant cette position, les signaux de sortie du canal correspondant à la position sélectionnée apparaissent à la prise [HEADPHONES].
INPUT VIDEO: Le niveau d'entrée vidéo connecté au connecteur [VIDEO IN] ou [CAMERA] sur le panneau des connexions est affiché.
RF: Le niveau de lecture RF de la tête vidéo est affiché.
BATTERY: La tension en courant continu est affichée.
Pendant le fonctionnement sur batterie, l'aiguille oscille dans la zone rouge quand la tension des batteries est en dessous de 11 V.
- La sortie à la prise [HEADPHONES], quand le sélecteur est sur INPUT VIDEO, RF ou BATTERY, est la sortie audio CH-1.

⑧ **Réglages de niveau d'enregistrement audio [AUDIO REC] (CH-1/2/3)**
Placer le sélecteur [METER/PHONE] soit sur AUDIO CH-1, AUDIO CH-2 ou AUDIO CH-3, et régler le bouton de réglage de canal de sorte que l'aiguille de l'indicateur pointe vers 0 VU, au niveau standard. (Il n'est pas possible de régler le niveau de lecture.)

⑨ **Réglage de niveau d'entrée vidéo [INPUT VIDEO]**
Placer le sélecteur [METER/PHONE] sur INPUT VIDEO, puis régler ce bouton de sorte que l'aiguille de l'indicateur oscille au centre de la zone bleue.
- Procéder comme précédemment et régler le niveau quand on connecte le signal de synchronisation comme signal de référence servo pendant la lecture, au connecteur [VIDEO IN] du panneau de connexions.

⑩ **Voyant d'alarme [SERVO/RECORD]**
Il s'allume quand le verrouillage servo a été désactivé pendant la lecture ou quand la tête vidéo/synchronisation est obstruée en mode d'enregistrement.

⑪ **Voyant d'alarme des signaux vidéo excessifs [EXCESS VIDEO]**
Il s'allume quand apparaissent des signaux d'entrée vidéo qui présentent des dangers de surmodulation. Vérifier alors le niveau d'entrée vidéo.
Si le sélecteur, placé sur INPUT VIDEO affiche une lecture normale, le problème vient du signal d'entrée vidéo. Vérifier le fonctionnement (diaphragme, niveau vidéo, niveau de chroma, ouverture, etc.) de la caméra ou vérifier de nouveau la source de signal.

⑫ **Voyant d'alarme des batteries [BATTERY]**
Il clignote quand la tension terminale des batteries incorporées est de 11 V et il reste allumé sans clignoter quand cette tension tombe au-dessous de 10,8 V.

⑬ **Touche/voyant d'enregistrement [REC]**
Le magnétoscope est placé en mode d'enregistrement quand on enfonce cette touche en même temps que la touche de lecture [PLAY].
Si la caméra (caméra Sony BVP) est connectée au connecteur [CAMERA] du panneau de connexions, on peut obtenir une fonction télécommandée (y compris l'enregistrement) à l'aide d'une commande de la caméra. (Se reporter au paragraphe "Interrupteur de montage d'un espacement arrière [BACK SPACE EDIT ON/OFF]" du panneau de connexions.)
- Le magnétoscope est en mode d'essai d'enregistrement quand l'interrupteur [REC TEST/REC INHIBIT ON/OFF] est placé sur REC TEST ON. (Se reporter à la section "Panneau de sous-contrôle-1".)

Pour ôter le magnétoscope du mode d'enregistrement, enfoncer soit la touche [STOP], [F.FWD] ou [REW]. De même on peut le faire à partir d'une caméra avec une télécommande.

⑭ **Touche/voyant de lecture [PLAY]**
Quand on l'enfonce, l'appareil est en mode de lecture normale. Si le signal vidéo/synchronisation ou la caméra sont connectés au connecteur [VIDEO IN] du panneau de connexions, la lecture servo est engagée dans ces signaux. Quand aucun signal n'est fourni, le verrouillage servo interne est automatiquement sélectionné.
Pour relâcher le mode de lecture, enfoncer la touche [STOP], [F.FWD] ou [REW].

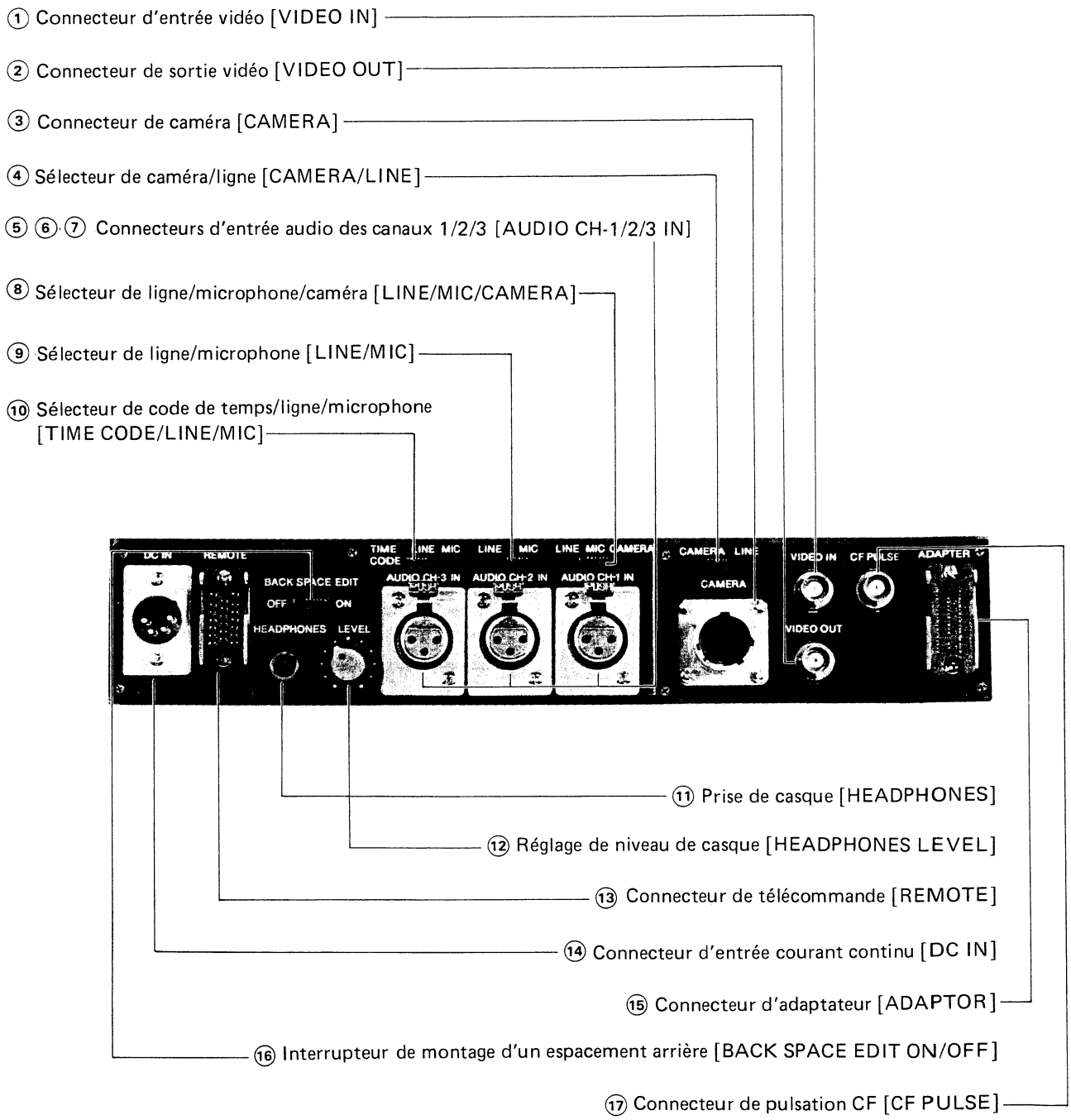
⑮ **Touche/voyant d'arrêt [STOP]**
On peut arrêter n'importe quel mode de fonctionnement sauf celui d'attente* et celui de montage d'un espacement arrière. Le moteur de la bobine s'arrête mécaniquement, le galet d'entraînement est relâché et le frein de la bobine est actionné.
* Les systèmes audio et vidéo sont placés sur EE quand on enfonce cette touche à l'attente (ON).
Quand on enfonce cette touche à l'attente (OFF), l'appareil se met en mode d'épargne de consommation environ 10 à 15 secondes après (seul le voyant [STOP] s'allume).
Avec l'arrêt automatique avant la fin de la bande (pendant l'enregistrement, la lecture ou l'avance rapide), le mode d'attente de l'appareil (sur ON) s'arrête automatiquement environ 10 à 15 secondes après.
- Une fois la bande sortie du système de transport de la bande (avec le rembobinage, etc.) le mode d'arrêt est automatiquement activé.

⑯ **Touche/voyant d'attente [STANDBY]**
Pour faire sortir (faire tourner) le tambour de tête. La pousser pour la mettre sur ON, la pousser de nouveau pour la relâcher. Pour un usage ordinaire, enfoncer cette touche sur la position ON et placer l'appareil sur le mode voulu une fois le tambour de tête émergé.

⑰ **Touche/voyant d'avance rapide [F.FWD]**
Enfoncée, elle s'allume et l'appareil est en mode d'avance rapide. Pour relâcher ce mode, enfoncer la touche [STOP], [PLAY] ou [REW].

⑱ **Touche/voyant de rembobinage [REW]**
Enfoncée, elle s'allume et l'appareil est en mode de rembobinage. Pour relâcher ce mode, enfoncer la touche [STOP], [PLAY] ou [F.FWD].

1-3-3. Panneau de connexions



① **Connecteur d'entrée vidéo [VIDEO IN]**
Connecteur BNC, signal vidéo composite 1,0 Vc.-c., terminaison 75 ohms
Les signaux d'entrée vidéo peuvent être activés avec le sélecteur [CAMERA/LINE] comme suit:

Sélecteur [CAMERA/LINE]	CAMERA:	Entrée caméra en provenance du connecteur de caméra à 14 broches
	LINE:	Entrée de ce connecteur [VIDEO IN]

On l'utilise également pour le signal de référence servo de lecture (vidéo/synchronisation).

② **Connecteur de sortie vidéo [VIDEO OUT]**
Connecteur BNC, 1,0 Vc.-c., 75 ohms
Quand on l'utilise comme connecteur de contrôle (noir/blanc), connecter directement le moniteur TV. Quand une unité hétérodyne ou un correcteur de base temps est connecté, la lecture couleur sera possible. Pour la transmission du signal de lecture, connecter le correcteur de base temps/adaptateur de lecture au connecteur [ADAPTOR] ⑮ .

③ **Connecteur de caméra [CAMERA]**
Connecteur spécial à 14 broches
Lui connecter une caméra Sony BVP. Une fois cette caméra connectée, les signaux sont ceux-ci:

MIC IN:	Signal d'entrée microphone connecté à la tête de caméra
VIDEO IN:	Signal d'entrée vidéo en provenance de la caméra
VIDEO OUT:	Signal vidéo de retour en provenance du magnétoscope
BATTERY ALARM:	Un signal avertit de la condition des batteries à l'aide du voyant de signalisation du viseur.
REC TRIGGER:	Commande le départ ou l'arrêt de l'enregistrement de l'appareil
CAMERA ALARM:	Un signal avertit du déverrouillage du tambour, de l'absence de rotation du tambour, de l'excès vidéo, de la fiabilité vidéo au moyen d'un voyant de signalisation. (clignote) S'allume ——► Mode d'enregistrement
CAMERA STANDBY:	Des signaux commandent la rotation ou l'arrêt du tambour. Signaux de sélection audio de retour du magnétoscope, signaux audio surimposés (mixés) peuvent être contrôlés par la tête de caméra.

④ **Sélecteur de caméra/ligne [CAMERA/LINE]**
L'utiliser pour choisir l'entrée vidéo.
CAMERA: Pour les signaux d'entrée en provenance du connecteur [CAMERA]
LINE: Pour les signaux d'entrée en provenance du connecteur [VIDEO IN]

⑤

⑥ **Connecteurs d'entrée audio des canaux 1/2/3 [AUDIO CH-1/2/3 IN]**

⑦ Connecteurs Cannon 3P-XLR
Le niveau d'entrée et l'impédance dépendent des positions des sélecteurs ⑧, ⑨ et ⑩.

⑧ **Sélecteur de ligne/microphone/caméra [LINE/MIC/CAMERA] (AUDIO CH-1)**

⑨ **Sélecteur de ligne/microphone [LINE/MIC] (AUDIO CH-2)**

⑩ **Sélecteur de code de temps/ligne/microphone [TIME CODE/LINE/MIC] (AUDIO CH-3)**

CAMERA:	Impédance de 600 ohms, équilibrée
LINE:	Impédance de 600 ohms, équilibrée +27 à −22 dBm
MIC:	Impédance de 600 ohms, équilibrée −60 dBs (−72 à −20 dBs)
TIME CODE:	Utiliser cette position pour enregistrer la sortie du générateur de code de temps incorporé sur le canal audio CH-3. (Le niveau est préréglé sur le niveau standard.)

⑪ **Prise de casque [HEADPHONES]**
Prise binaurale
Brancher un casque d'une impédance de 8 ohms à 1 kohm dans cette prise. (Le niveau est réglable.)
Choisir les canaux AUDIO CH-1, CH-2 ou CH-3 en utilisant le sélecteur [METER/PHONE]. (Pour plus de détails, se référer à la section traitant du "Sélecteur d'indicateur et de casque [METER/PHONE]".) Quand on branche un casque d'écoute dans cette prise, les signaux de sortie ne sont plus disponibles dans la sortie moniteur du connecteur [ADAPTOR].

⑫ **Réglage de niveau de casque [HEADPHONES LEVEL]**
L'utiliser pour régler le niveau du casque branché dans la prise de casque [HEADPHONES] de −30 dB à −13 dB.
Il est possible de varier le niveau de sortie moniteur du connecteur [ADAPTOR] quand le casque n'est pas branché dans la prise [HEADPHONES].

⑬ **Connecteur de télécommande [REMOTE]**
Connecteur spécial à 20 broches
Il est possible de faire fonctionner le magnétoscope avec une télécommande en connectant la boîte de fonction de télécommande sur option dans ce connecteur. La commande de mode d'enregistrement, de lecture, d'arrêt, d'avance rapide, de rembobinage et d'attente, les voyants, l'affichage et le voyant servo (verrouillage du cabestan), de même que les signaux de +5 V (l'un est de 15 à 20 mA et l'autre de 200 mA maximum dans le mode de non économie de consommation) sont disponibles. (Un fonctionnement parallèle est la base du fonctionnement.)

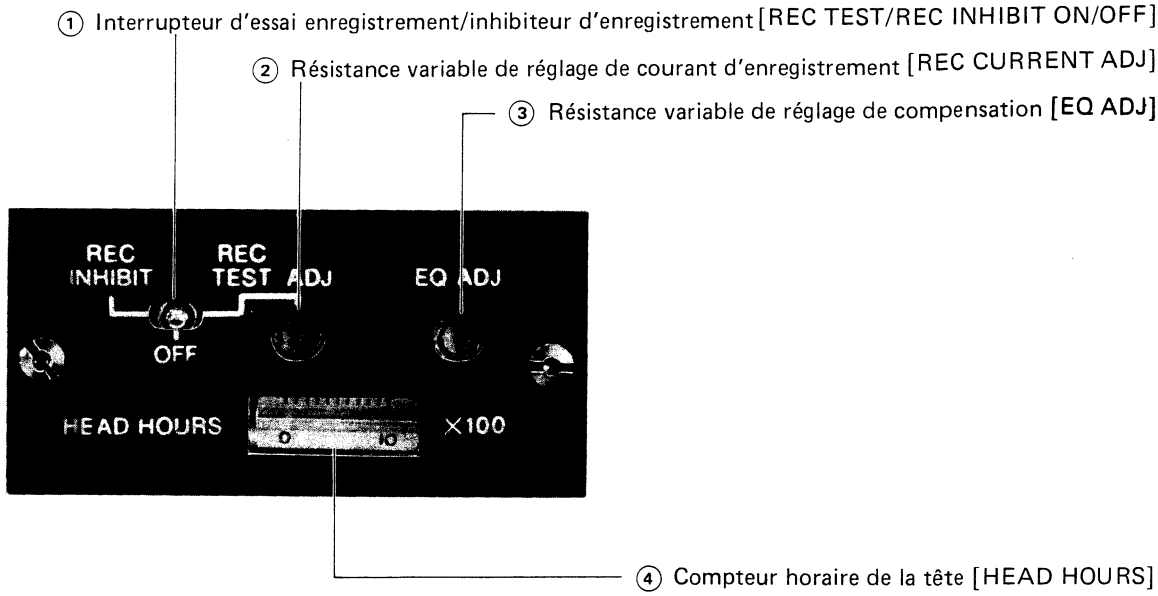
⑭ **Connecteur d'entrée courant continu [DC IN]**
Connecteur Cannon 4P-XLR
Lui connecter l'adaptateur d'alimentation secteur sur option (AC-500CE).
Utiliser le sélecteur de source d'alimentation [POWER SOURCE] du panneau des commandes de fonction pour choisir l'alimentation sur batteries ou sur source extérieure. (Capacité: 12 V CC, 6 à 8 A)

⑮ **Connecteur d'adaptateur [ADAPTOR]**
Connecteur spécial à 24 broches
En connectant l'adaptateur de lecture sur option ou le correcteur de base temps, les caractéristiques audio et vidéo qui sont équivalentes à celles du BVH-1100PS, sont disponibles.

⑯ **Interrupteur de montage d'un espacement arrière [BACK SPACE EDIT ON/OFF]**
L'utiliser pour sélectionner un enregistrement ordinaire ou le montage d'un espacement arrière.
ON: Pour l'enregistrement par caméra
La bande se rembobine automatiquement pendant environ 4 secondes à la fin de l'enregistrement par caméra et s'arrête. Avec l'interrupteur [TRIGGER ON], on peut obtenir la lecture de la bande (verrouillage servo) puis un montage d'assemblage.
Le voyant d'alarme de la caméra ne clignote plus, mais reste allumé.
Quand on enfonce la touche d'arrêt [STOP], la bande se rembobine automatiquement pendant environ 4 secondes et s'arrête. Puis, si l'on enfonce les touches d'enregistrement [REC] et de lecture [PLAY], on obtiendra un montage d'assemblage après 4 secondes de lecture (8 secondes en mode d'image couleur).
OFF: Pas de montage d'un espacement arrière
Quand on enfonce les touches d'enregistrement [REC] et de lecture [PLAY], le magnétoscope est en mode d'enregistrement.

⑰ **Connecteur de pulsation CF [CF PULSE]**
Connecteur BNC, niveau TTL, cycle d'utilisation 50%, bord négatif
Ce connecteur d'entrée pour l'enregistrement et la lecture maintient les pulsations d'image couleur de 6,25 Hz (signaux de synchronisation).
Pendant la lecture, les signaux discriminateurs d'image couleur sont enregistrés sur la piste CTL (contrôle) seule (sur la bande).

1-3-4. Panneau de sous-contrôle-1



① **Interrupteur d'essai enregistrement/inhibiteur d'enregistrement [REC TEST/REC INHIBIT ON/OFF]**

REC TEST ON: Utiliser cet interrupteur lors du réglage du courant d'enregistrement de la tête vidéo. Quand il est sur cette position et que les touches [REC] et [PLAY] sont enfoncées, on peut mettre alternativement l'appareil en mode d'enregistrement et de lecture et de façon répétée à 0,8 à 1,0 seconde d'intervalle. Pour les réglages, placer le sélecteur [METER/PHONE] du panneau des commandes de fonction sur la position RF, puis régler la résistance variable [REC CURRENT ADJ] de sorte que l'aiguille oscille vers le maximum.

Le voyant d'enregistrement [REC] clignote quand le courant d'enregistrement est réglé.

Quand on enfonce la touche de lecture [PLAY], l'appareil se met dans le mode d'arrêt sur image (le voyant de lecture [PLAY] clignote). Cependant, à moins que cet interrupteur ne soit sur OFF, il n'est pas possible de transférer le mode de l'appareil dans un autre mode (lecture, enregistrement, avance rapide, rembobinage), excepté le mode d'arrêt.

- Quand l'appareil est en mode de lecture, d'enregistrement, d'avance rapide ou de rembobinage, et que l'interrupteur est placé sur ON, il peut alors être passé dans le mode d'arrêt.

REC TEST OFF: La fonction d'essai du courant d'enregistrement s'annule (l'appareil se met en mode d'arrêt).

REC INHIBIT ON: Cet interrupteur empêche l'appareil de se mettre en mode d'enregistrement, et le placer sur cette position pendant la lecture, le rembobinage ou l'avance rapide d'une bande préenregistrée. (La touche [REC] est ineffective.)

REC INHIBIT OFF: La fonction d'inhibition d'enregistrement est ineffective.

② **Résistance variable de réglage de courant d'enregistrement [REC CURRENT ADJ]**

L'utiliser pour régler le courant d'enregistrement du canal vidéo/synchro. de la tête vidéo.

③ **Résistance variable de réglage de compensation [EQ ADJ]**

L'utiliser pour compenser la réponse en fréquence des signaux vidéo pendant la lecture.

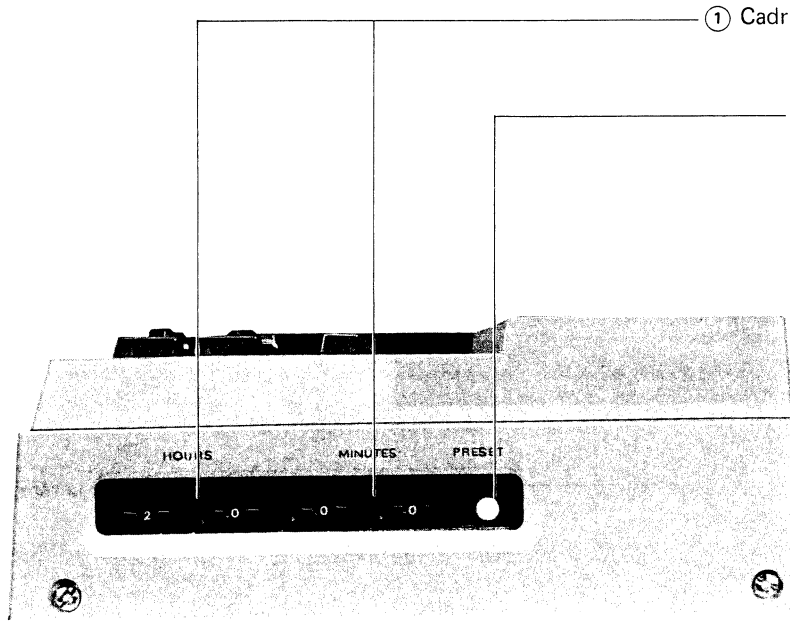
Placer cette résistance variable sur la valeur appropriée quand on branche l'adaptateur de lecture sur option et le correcteur de base temps.

④ **Compteur horaire de la tête [HEAD HOURS]**

Compteur horaire d'une capacité totale de 1000 heures

Il est activé quand le tambour se met à tourner et il indique le nombre d'heures d'utilisation de la tête.

1-3-5. Panneau de sous-contrôle-2

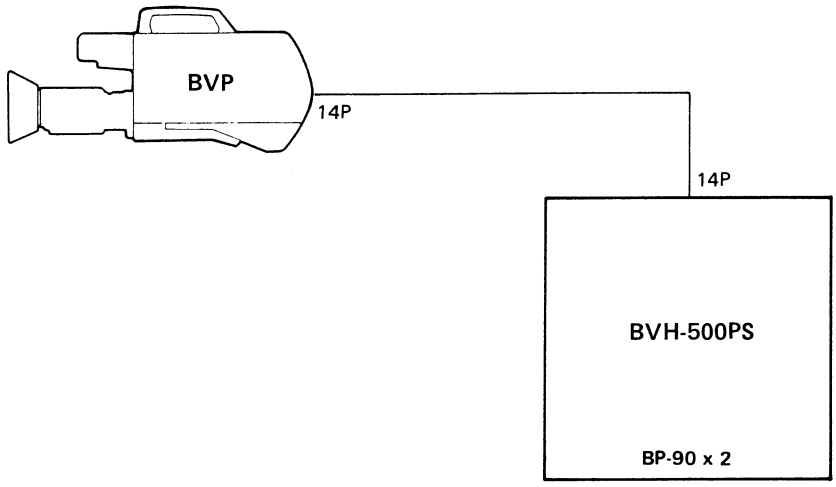


① **Cadrans de préréglage du code de temps**
Pour régler le code de temps (00_H00_{MIN}).
- Chiffres secondes et images 00.00
- Quand on enregistre le code de temps sur le canal audio CH-3, toujours placer le sélecteur [TIME CODE/LINE/MIC] du panneau de connexions sur la position TIME CODE.

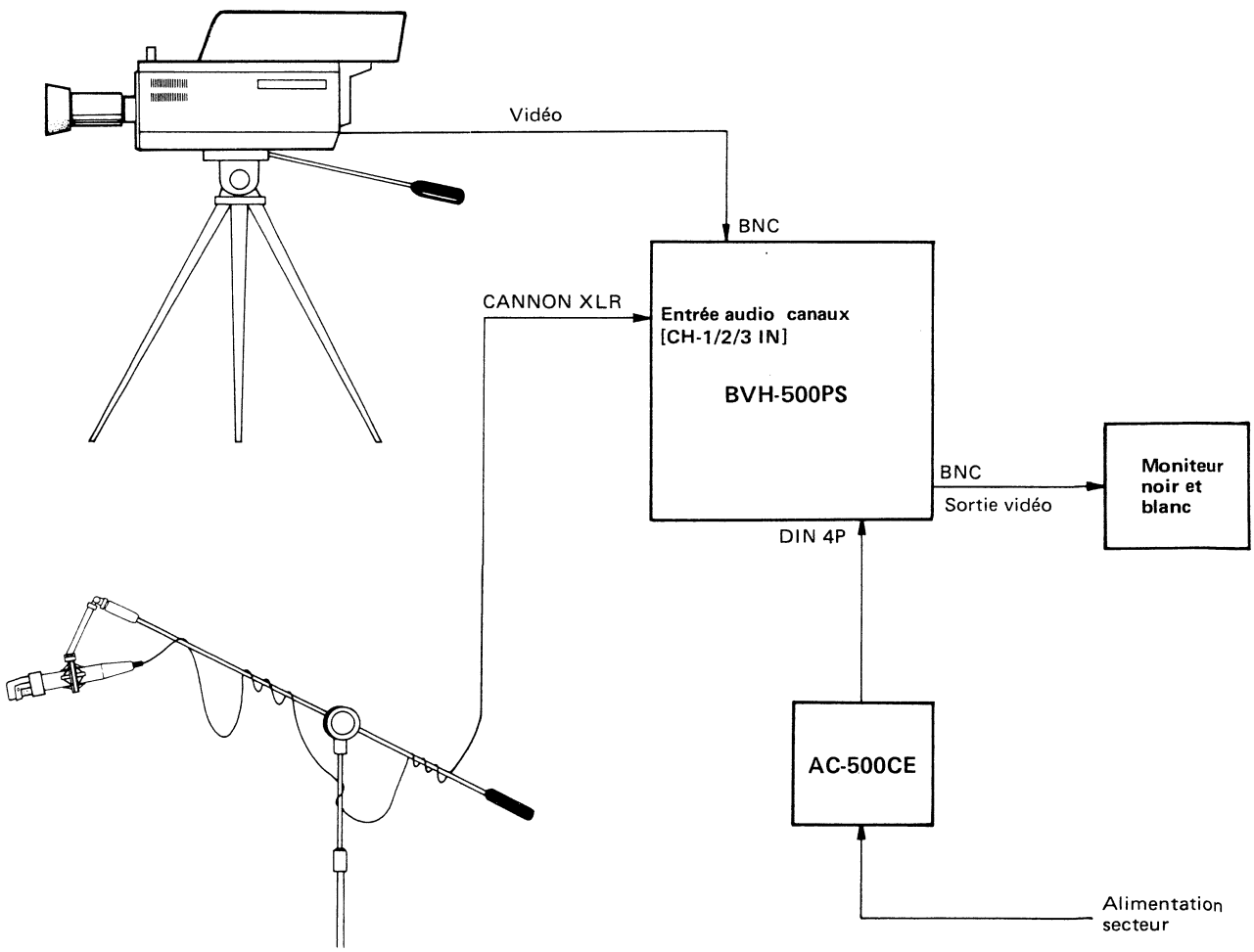
② **Bouton de préréglage [PRESET]**
L'enfoncer pour démarrer avec le code de temps qui a été réglé avec les cadrans de préréglage du code de temps.

1-4. CONNEXIONS

1-4-1. Fonctionnement sur batterie (en extérieur)

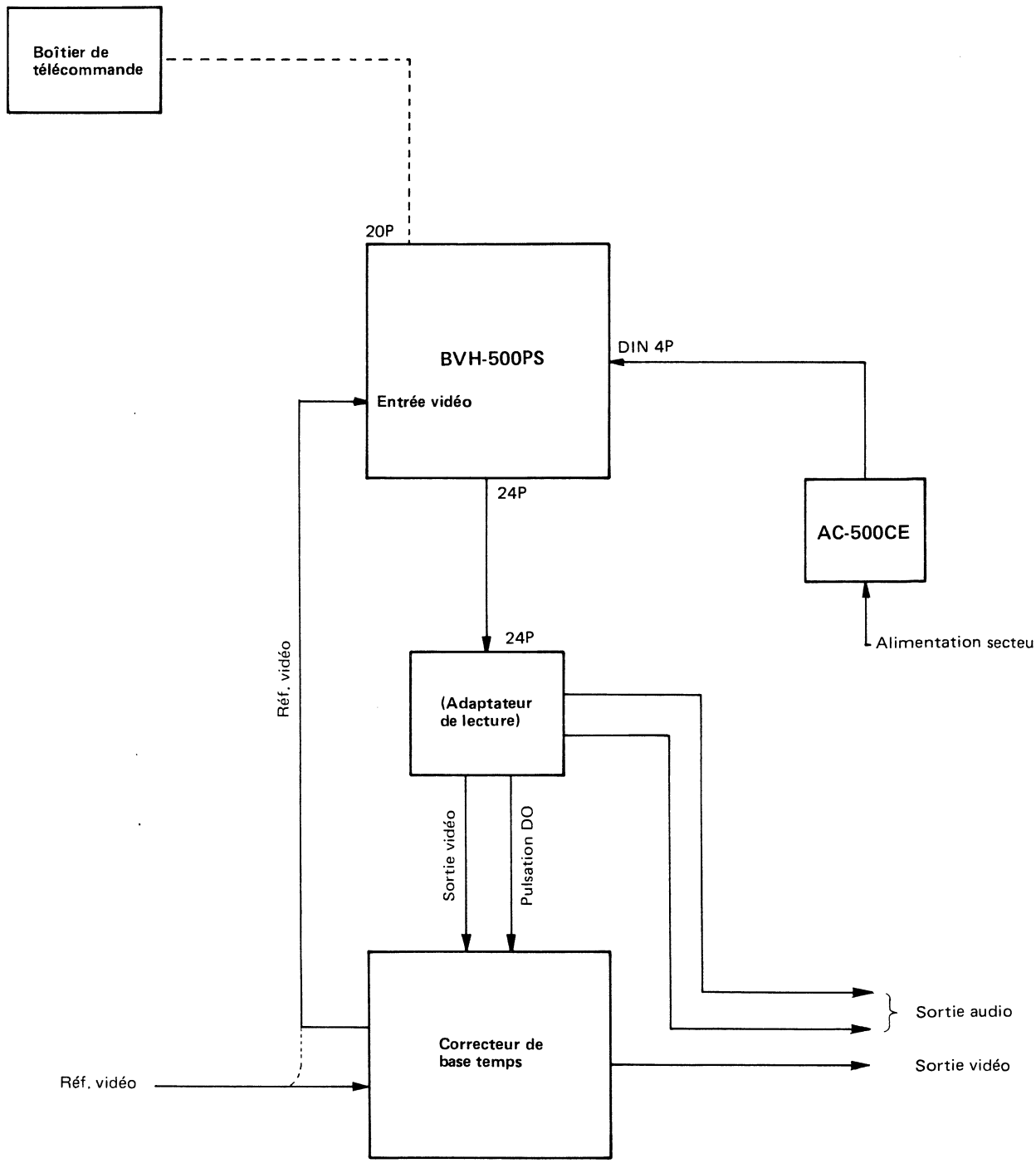


1-4-2. Fonctionnement sur courant secteur (utilisation en studio)



1-4-3. Lecture

Comme le BVH-500PS est conçu tout spécialement pour l'enregistrement, la lecture se fait habituellement en utilisant le BVH-1100PS.

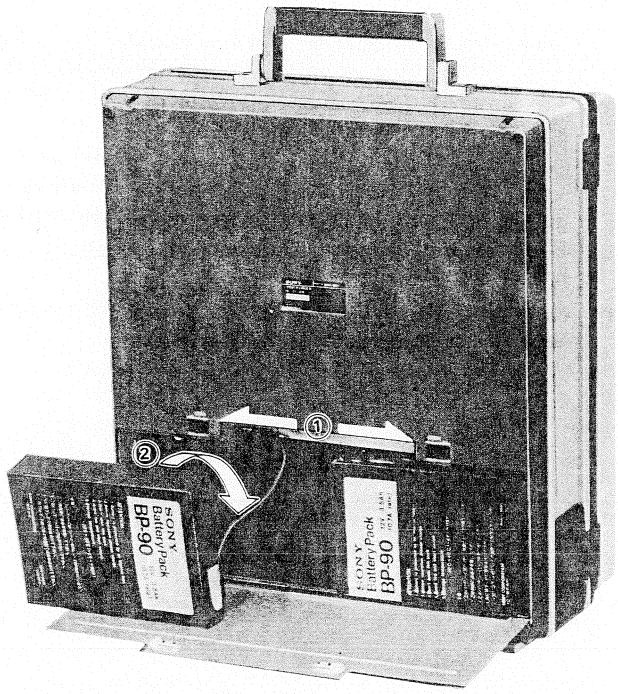


1-5. MISE EN PLACE DES BATTERIES

1) Utiliser deux batteries Sony BP-90.

2) Vérifier que les batteries sont bien chargées. (Si la charge des deux batteries n'est pas équilibrée, le fonctionnement de l'appareil peut être instable. Ceci peut également endommager les batteries.)

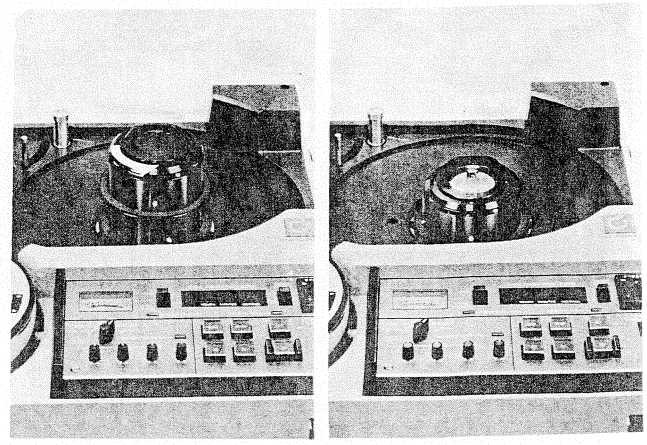
3) Ouvrir le compartiment batterie, y placer les deux batteries comme indiqué sur l'illustration et insérer la fiche dans la prise.
   - N'utiliser que des batteries Sony, car la polarité de la fiche de la batterie peut différer.



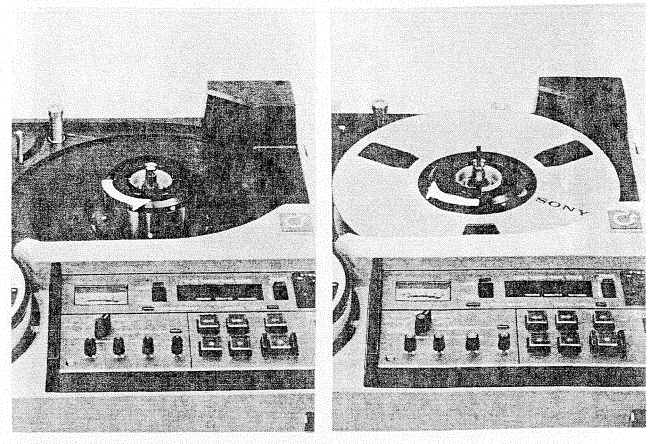
4) Refermer le compartiment batterie. Les batteries sont alors en place.

1-6. MISE EN PLACE DE LA BANDE

1) Faire tourner le verrouillage du tableau de la bobine réceptrice en sens inverse des aiguilles d'une montre, l'aligner avec les marques "verte" et "rouge" puis retirer le tableau de la bobine réceptrice.

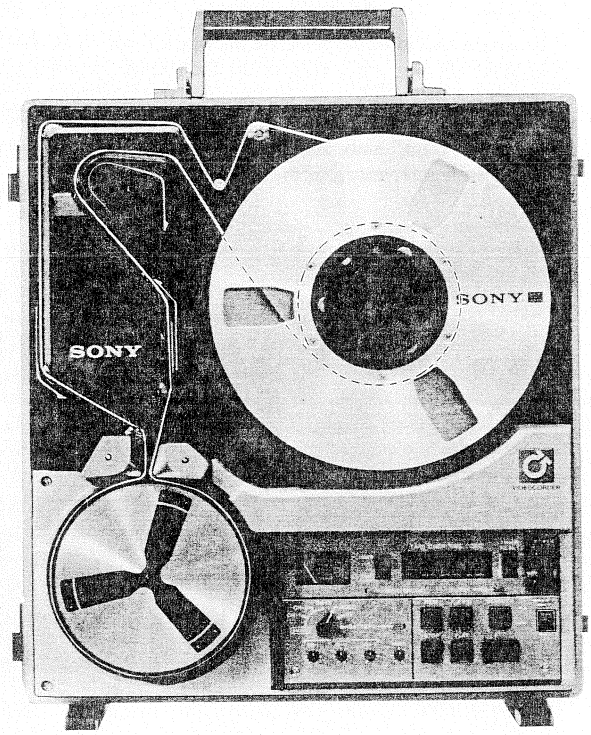


2) Faire tourner le verrouillage du tableau de la bobine débitrice en sens inverse des aiguilles d'une monte et l'aligner avec les marques "verte" et "rouge". Puis placer la bobine à bande sur le tableau de la bobine débitrice, mettre les trois encoches de la bobine dans les trois pointes du tableau de la bobine, faire tourner le verrouillage de bobine dans la direction opposée (sens des aiguilles d'une montre) jusqu'à l'endroit où les deux marques "vertes" sont alignées et le verrouiller. (La bobine à bande est maintenant fermement fixée.)



3) Placer le tableau de la bobine réceptrice sur l'axe de bobine.
Placer la bobine vide sur le tableau de la bobine réceptrice, faire tourner le verrouillage dans le sens des aiguilles d'une montre jusqu'à l'endroit où les deux marques "vertes" sont alignées et le verrouiller. La bobine vide (pour la bande) est maintenant fermement fixée.
   - Quand on place le tableau de la bobine réceptrice sur l'axe de bobine, vérifier qu'il est bien inséré. (Il se produira un déclic quand on tourne le tableau de la bobine réceptrice.)
   - Utiliser le même format standard pour les deux bobines, par exemple deux bobines de 9 pouces.

4) Tirer un peu de bande hors de la bobine débitrice et après l'avoir enfilée comme indiqué sur l'illustration, enlever tout le jeu restant en faisant tourner la bobine à la main.



1-7. FONCTIONNEMENT

1-7-1. Préparation

1) Vérifier les connexions d'entrée et de sortie du câble et l'état des batteries (en observant les voyants d'alarme [METER] et [BATTERY]).

2) Régler le niveau des signaux d'entrée vidéo et audio.
Une fois l'appareil réglé sur le mode d'attente, enfoncer la touche d'arrêt [STOP] et le placer sur le mode EE.
Vidéo: Placer le sélecteur [METER/PHONE] sur INPUT VIDEO et régler le réglage de niveau d'entrée vidéo [INPUT VIDEO] de sorte que l'aiguille oscille vers le centre de la zone bleue.
Audio: Placer le sélecteur [METER/PHONE] sur AUDIO CH-1, CH-2 ou CH-3 puis régler le réglage de canal correspondant de sorte que l'aiguille oscille vers 0 VU pour un niveau standard.

3) Quand on enregistre le code de temps sur le canal audio CH-3, placer le sélecteur [TIME CODE/LINE/MIC] du panneau de connexions sur la position TIME CODE, (Il n'est pas nécessaire de procéder à ce réglage si le niveau est déjà réglé sur une valeur standard.)

4) Placer l'interrupteur [BACK SPACE EDIT ON/OFF] sur ON ou sur OFF selon l'utilisation que l'on envisage.

1-7-2. Enregistrement

1) Placer l'interrupteur [REC TEST/REC INHIBIT ON/OFF] du panneau de sous-contrôle-1 sur la position REC TEST puis régler le courant d'enregistrement comme suit:
Enfoncer les touches d'enregistrement [REC] et de lecture [PLAY] et l'appareil se mettra alternativement et de façon répétée en mode d'enregistrement et de lecture à 0,8 à 1,0 seconde d'intervalle (le voyant d'enregistrement [REC] clignote). Puis, placer le sélecteur [METER/PHONE] sur la position RF et régler la résistance variable [REC CURRENT ADJ] de sorte que l'aiguille oscille vers le maximum. Une fois le réglage terminé, placer cet interrupteur sur REC TEST OFF.

2) Enfoncer la touche d'attente [STANDBY] pour faire sortir le tambour de tête.

3) Enfoncer les touches d'enregistrement [REC] et de lecture [PLAY] puis placer l'appareil en mode d'enregistrement. (La bande se met en mouvement.) Quand on a branché une caméra Sony BVP, il est possible de placer le magnétoscope en mode d'enregistrement avec un signal de déclenchement en provenance de la caméra.
Vérifier que les voyants d'alarme ne se sont pas allumés.

4) Pour relâcher le mode d'enregistrement, enfoncer la touche d'arrêt [STOP] du magnétoscope ou envoyer un signal de déclenchement de la caméra.
   - Quand on enfonce simultanément deux ou plusieurs touches de fonctionnement (excepté les touches [REC] et [STANDBY]), l'une d'elles a la priorité dans l'ordre suivant:
     (1) touche d'arrêt [STOP] (mode d'arrêt)
     (2) touche de lecture [PLAY] (mode de lecture)
     (3) touche d'avance rapide [F.FWD] (mode d'avance rapide)
     (4) touche de rembobinage [REW] (mode de rembobinage)
   - Pour enregistrer en mode d'image couleur, s'assurer de connecter le signal spécifié au connecteur [CF PULSE] situé sur le panneau de connexions.

1-7-3. Lecture

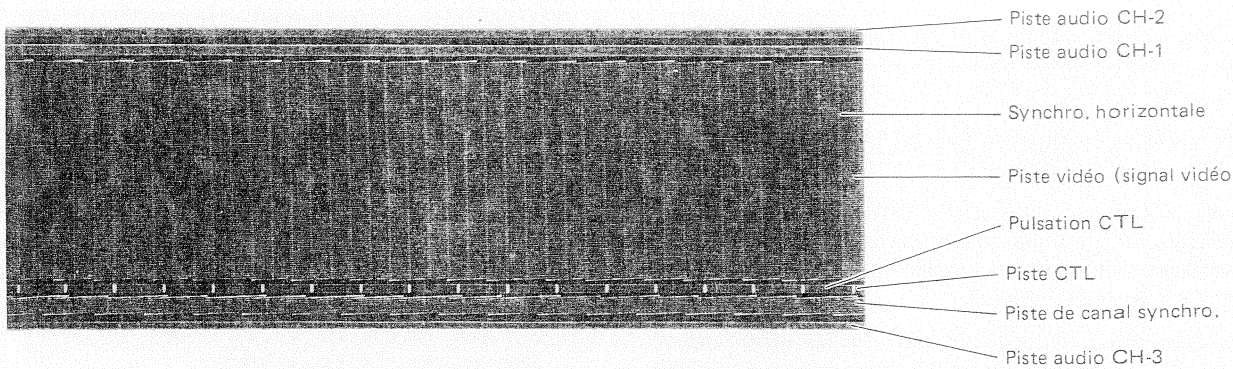
Le panneau de connexions est équipé d'un connecteur de sortie vidéo [VIDEO OUT] mais comme ce modèle est conçu tout spécialement pour l'enregistrement (reportages), la lecture se fait habituellement en utilisant le BVH-1100PS.

Quand on branche un moniteur couleur sur le connecteur de sortie vidéo [VIDEO OUT] et que l'on enfonce la touche de lecture [PLAY] pour obtenir une lecture avec ce seul magnétoscope (sans adaptateur), les signaux couleur seront instables, parce que le système d'enregistrement est du type à haute gamme FM directe, et les images apparaîtront en noir et blanc.

Placer le sélecteur [REC TEST/REC INHIBIT ON/OFF] sur la position REC INHIBIT ON pendant la lecture. L'appareil ne peut alors se mettre en mode d'enregistrement par suite d'une erreur de manipulation. Il est ainsi possible d'éviter des accidents dans lesquels on effacerait des enregistrements importants.

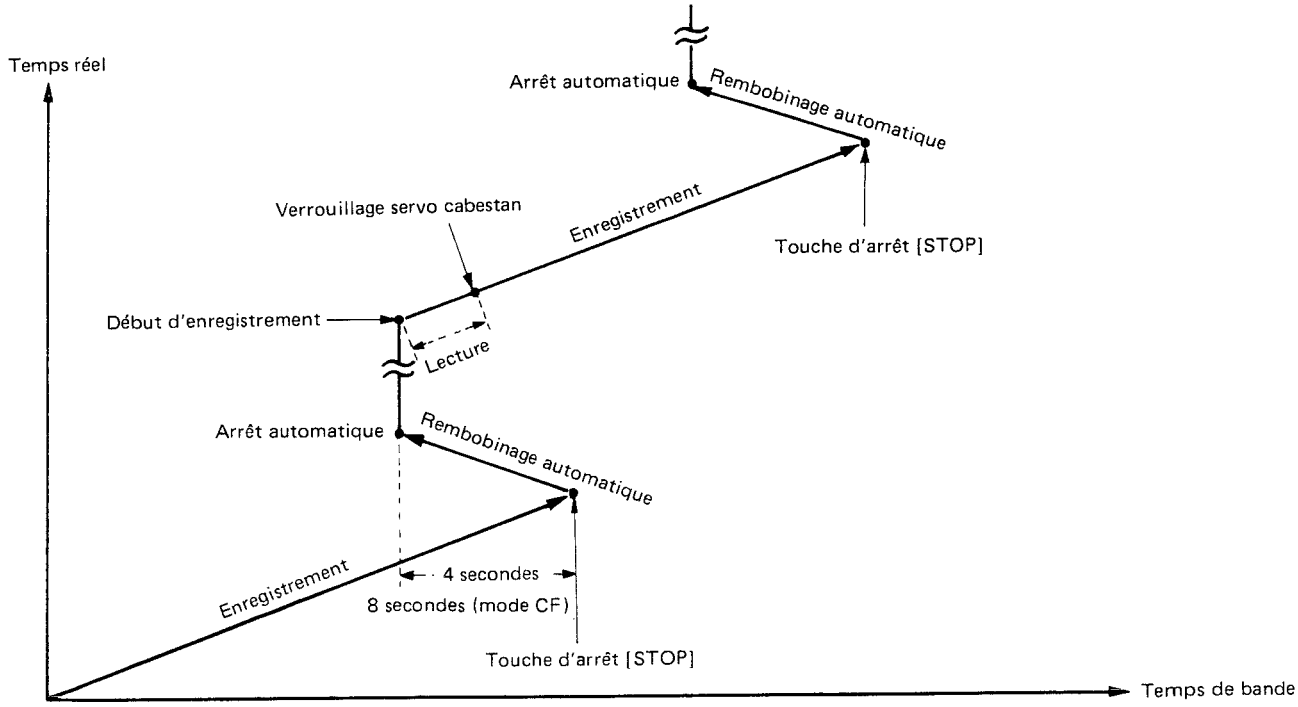
- Pendant la lecture, il n'est pas possible d'afficher le code de temps enregistré sur la piste audio CH-3 et placer ainsi le sélecteur [TAPE TIMER/TIME CODE] sur la position TIMER.

La photographie suivante représente le diagramme des pistes de la bande enregistrées sur cet appareil.



1-7-4. Montage d'un espacement arrière

Placer l'interrupteur [BACK SPACE EDIT ON/OFF] sur ON; les opérations indiquées dans l'illustration suivante se répètent jusqu'à la fin de l'enregistrement.



Comme indiqué sur la figure, si la touche d'arrêt [STOP] est enfoncée ou si un signal de déclenchement est lancé à partir de la caméra à la fin de l'enregistrement, la bande s'inverse automatiquement pendant 4 secondes et l'appareil se met en mode d'arrêt automatique.

Si on utilise alors la commande de départ d'enregistrement, l'appareil se met en mode de lecture et ensuite en mode d'enregistrement (montage d'assemblage) quand le servo cabestan est verrouillé.

En d'autres termes, les images ne ressentent pas les transitions entre les sections enregistrées mais sont reliées entre elles en séquence.

La fonction de montage d'espacement arrière est pour le montage d'assemblage et il n'y a pas de fonction de montage d'insertion permettant aux images ou au son (ou aux deux) d'être remplacés aux sections d'une bande préenregistrée.

- Quand on utilise la fonction de montage d'un espacement arrière, le code de temps du canal audio CH-3 s'en ressent aux transitions et ce pendant plusieurs images.

1-7-5. Mémoire du code temps

Quand l'interrupteur d'alimentation [POWER] est sur OFF.

1) Quand l'alimentation est fournie à partir des piles internes (BP-90) ou à partir du fournisseur d'alimentation extérieure (AC-500), le code temps est conservé dans la mémoire même si l'interrupteur d'alimentation [POWER] de l'appareil est sur OFF (avec le sélecteur de source d'alimentation [POWER SOURCE] sur la même position).

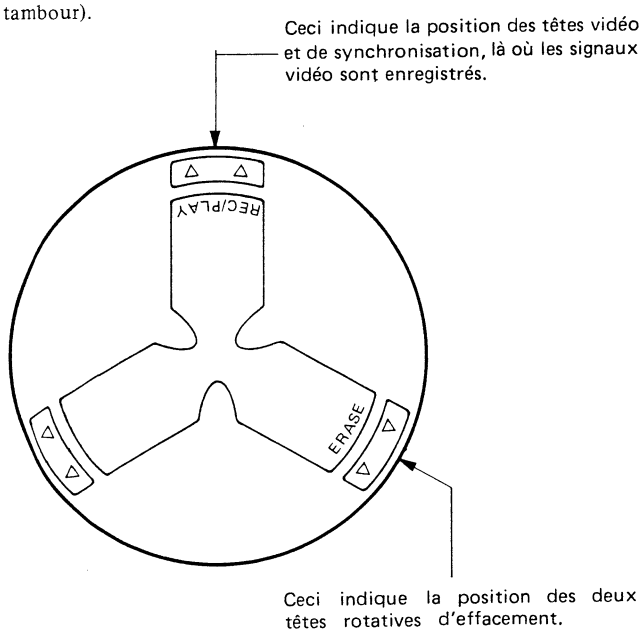
2) Quand l'alimentation en provenance des piles internes (BP-90) ou du fournisseur d'alimentation extérieure (AC-500) est coupée momentanément, le code temps est conservé dans la mémoire immédiatement après, pendant environ cinq minutes.

- Pour éviter qu'il n'y ait trop d'intensité sur les piles quand l'appareil n'est pas utilisé, mettre le sélecteur de source d'alimentation [POWER SOURCE] sur la position qui ne correspond pas à la valeur de l'alimentation fournie (sur EXT quand les piles ne sont pas utilisées).

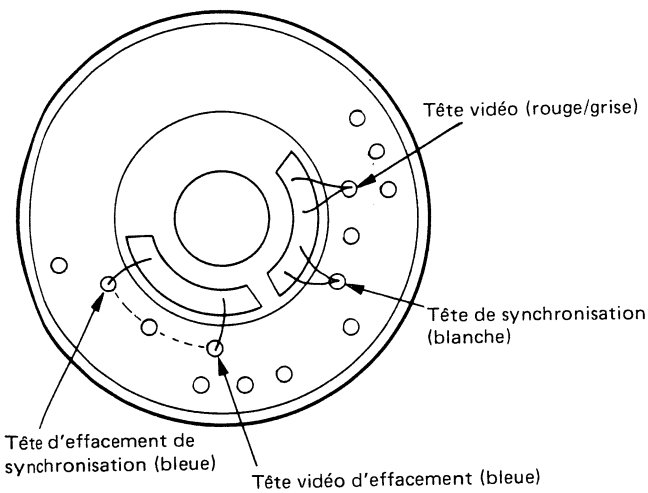
1-8. ENTRETIEN

- Pour éviter que la tête rotative ne s'obstrue, essuyer les têtes vidéo et d'effacement avec une peau de chamois humectée de fréon ou d'alcool.

L'illustration indique l'emplacement des différentes têtes (sommet du tambour).



La figure suivante représente les positions des têtes quand le haut du tambour est retiré.

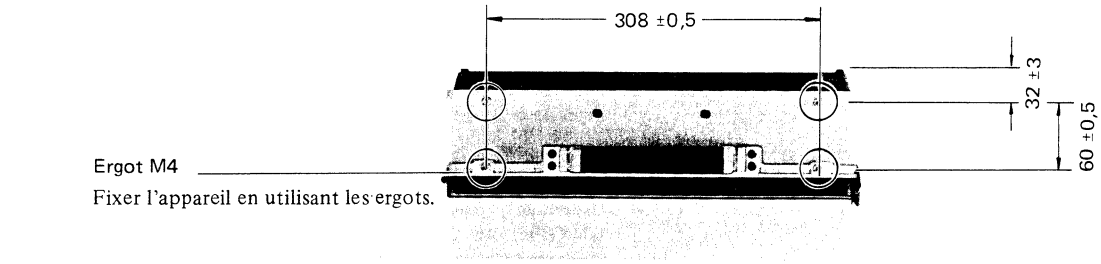


- Laisser toujours les surfaces des têtes fixes (tête audio d'enregistrement/lecture, tête vidéo de moniteur, tête audio d'effacement) propres.
- De même, laisser le guide de bande et les galets de guidage qui sont en contact avec la bande, propres.

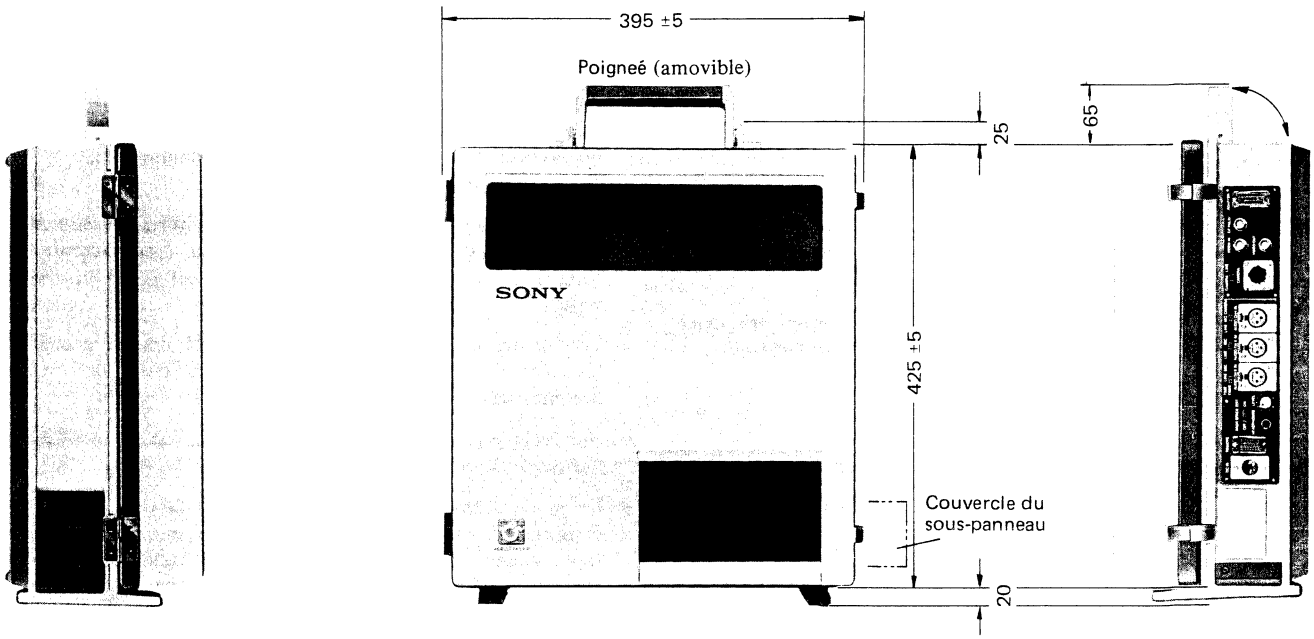
1-9. PRECAUTIONS

- Quand on enregistre des signaux en provenance de la caméra, vérifier les réglages des interrupteurs du panneau de connexions et le niveau du signal d'entrée.
  Etat de mise en place de la bande
  Position du sélecteur [METER/PHONE]
  Niveaux d'entrée des signaux vidéo et audio
  Position de l'interrupteur [BACK SPACE EDIT ON/OFF]
  Position du sélecteur [CAMERA/MIC/LINE/TIME CODE]
  Position de l'interrupteur [REC INHIBIT ON/OFF]
- La commande de départ d'enregistrement de la caméra peut être activée quel que soit le mode de l'appareil.
  Cependant, placer l'interrupteur [REC TEST/REC INHIBIT ON/OFF] sur la position REC INHIBIT ON et annuler la commande à partir de la caméra lors de la lecture d'une bande préenregistrée, etc.
- Manipuler la bande avec précaution.
  Ne pas toucher la surface enduite de la bande.
  Ne pas plisser le bord de la bande. Si la fin de la bande est plissée ou froissée, la couper.
  Ne pas plier la bande quand on l'enfile.
  Ne pas utiliser des bandes très plissées ou endommagées.
  Ne pas coller la bande.
- Quand la bande défile, ne pas couper par inadvertance l'alimentation ou changer le mode d'alimentation (par exemple de l'alimentation sur batterie à l'alimentation extérieure ou vice et versa.)
- Vérifier toujours que l'alimentation a été coupée avant de brancher des unités dans les connecteurs ou avant de les déconnecter.
- Vérifier que les batteries sont pleinement chargées et toujours en utiliser deux à la fois.
- De la condensation peut se former si on fait passer l'appareil d'un endroit à un autre avec brusque changement de température. Si une importante condensation se forme, les tambours peuvent s'arrêter de tourner. Dans ce cas, essuyer la condensation ou sécher les tambours.
- Ne pas procéder à un enregistrement ou à une lecture dans des endroits soumis à de fortes vibrations.
- Ne pas utiliser l'appareil dans des endroits exposés au rayonnement direct du soleil, à des températures très élevées ni le soumettre à une forte humidité.
- Ne pas placer l'appareil près de champs magnétiques ou électriques forts.
- Ne pas cogner violemment l'appareil pendant son fonctionnement.
- Retirer les batteries si l'appareil ne doit pas être utilisé pendant longtemps.
- Essuyer la poussière du coffret ou du panneau avec une étoffe sèche. Ne jamais utiliser d'alcool, de benzine, de dissolvant ou autres produits chimiques, étant donné que ces substances peuvent endommager le fini du panneau ou effacer les inscriptions.
- S'il n'est pas possible de retirer la poussière ou les taches avec une simple étoffe sèche, utiliser un nettoyant neutre dilué dans de l'eau et essuyer les parties salies. Sécher ensuite avec une étoffe sèche pour enlever toute trace du produit.

1-10. UTILISATION STATIQUE

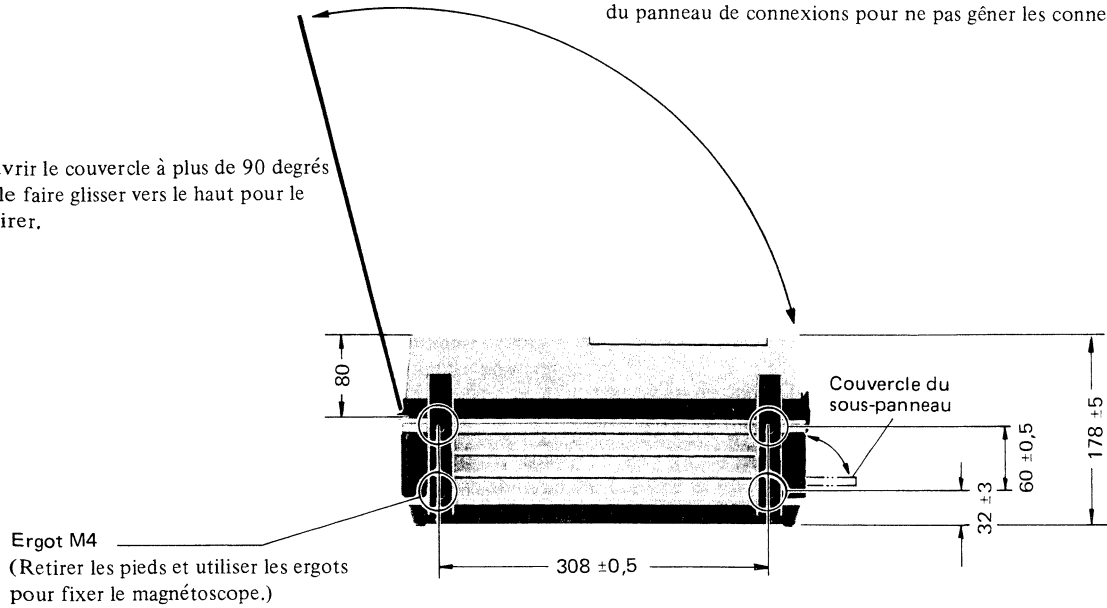


Fixer l'appareil en utilisant les ergots.



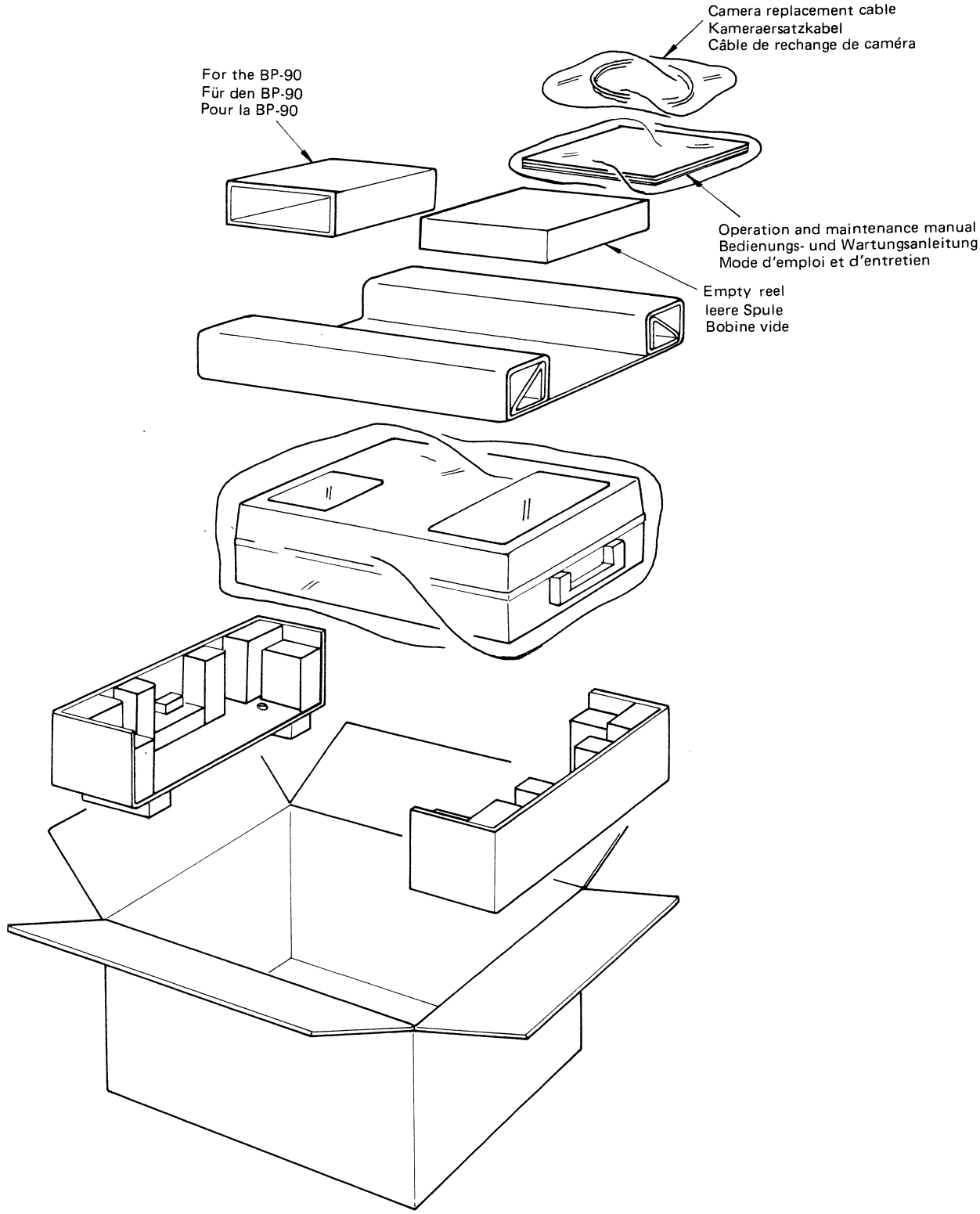
Lorsque l'on met le magnétoscope en place, laisser un espace du côté du panneau de connexions pour ne pas gêner les connexions.

Ouvrir le couvercle à plus de 90 degrés et le faire glisser vers le haut pour le retirer.



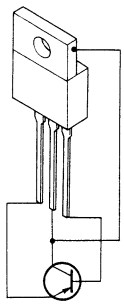
(Retirer les pieds et utiliser les ergots pour fixer le magnétoscope.)

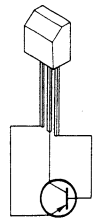
1-11. PACKING/VERPACKUNG/EMBALLAGE

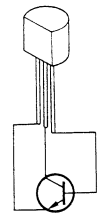


SECTION 3
DIAGRAMS

SEMICONDUCTOR ELECTRODES


2SA473
2SB566


2SA844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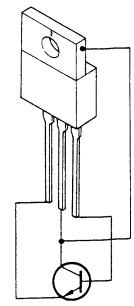
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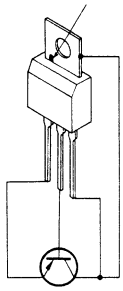
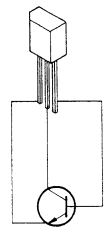
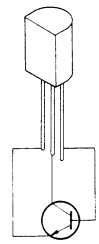


2SA706


2SC403C
2SC1636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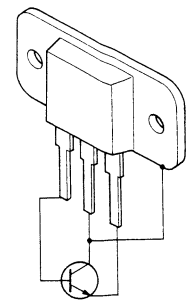
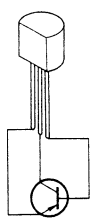
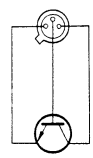
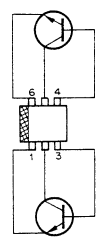

2SD735


2SA733

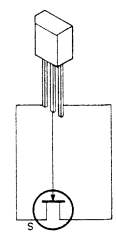
BOTTOM VIEW


2SC689H

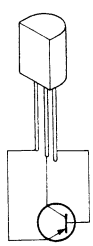
TOP VIEW

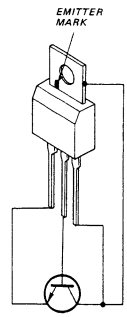


2SC1963

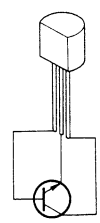


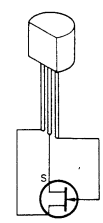
2SK23


2SA772
2SA840



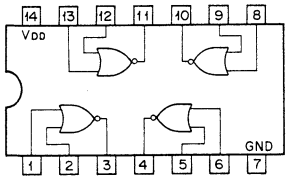
2SC1124

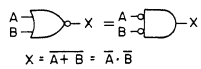

2SC2009



2SK43

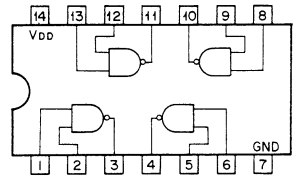
CD4001AE/BE (RCA)
TC4001BP (TOSHIBA)
TC4001UBP (TOSHIBA)
μPD4001C (NEC)
C-MOS 2-INPUT NOR GATE
-TOP VIEW-

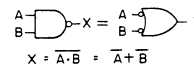




A	B	X
L	L	H
L	H	L
H	L	L
H	H	L

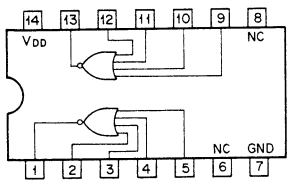
CD4011AE/BE (RCA)
TC4011BP (TOSHIBA)
TC4011UBP (TOSHIBA)
C-MOS 2-INPUT NAND GATE
-TOP VIEW-

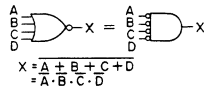




A	B	X
L	L	H
L	H	H
H	L	H
H	H	L

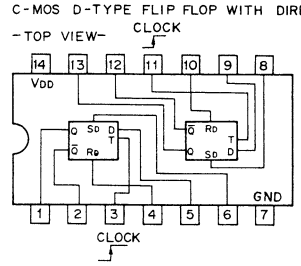
CD4002AE/BE(RCA)
TC4002BP (TOSHIBA)
C-MOS 4-INPUT NOR GATE
-TOP VIEW-





A	B	C	D	X
L	L	L	L	H
L	L	L	H	L
L	L	H	L	L
L	L	H	H	L
⋮	⋮	⋮	⋮	L
H	H	H	L	L
H	H	H	H	L

CD4013AE/BE(RCA)
TC4013BP (TOSHIBA)
C-MOS D-TYPE FLIP FLOP WITH DIRECT SET/RESET
-TOP VIEW-



DIRECT R-S FLIP FLOP

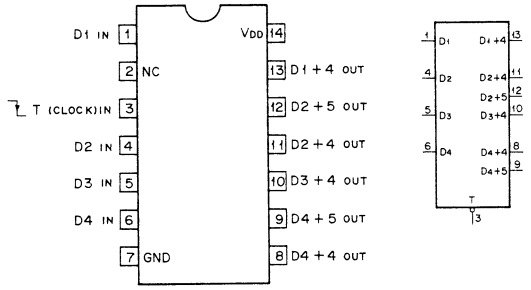
SD	RD	Q
L	L	On
L	H	L
H	L	H
H	H	L

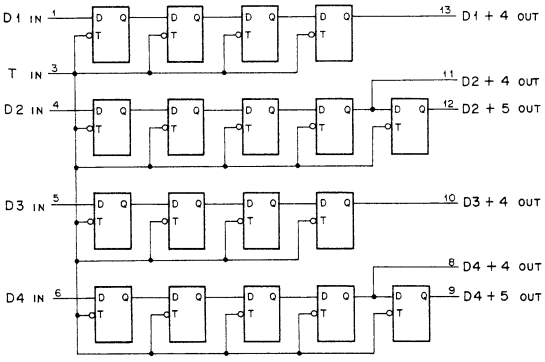
D-TYPE FLIP FLOP

tn	tn+1
D	Q
L	L
H	H

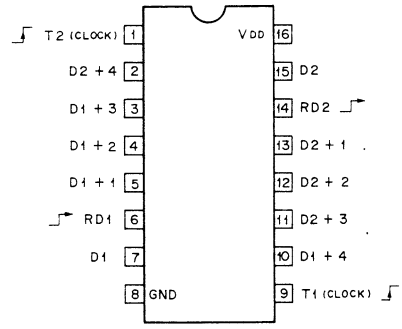
CLOCK T;
tn; BEFORE CLOCK
tn+1; AFTER CLOCK

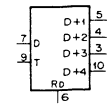
CD4006AE (RCA)
TC4006BP (TOSHIBA)
C-MOS 18-BIT STATIC SHIFT REGISTER
- TOP VIEW -

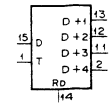


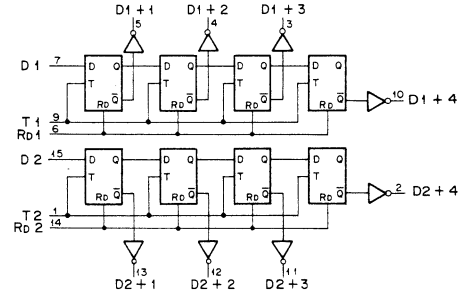


CD4015AE (RCA)
TC4015BP (TOSHIBA)
C-MOS DUAL 4-STAGE STATIC SHIFT REGISTER WITH DIRECT RESET
- TOP VIEW -





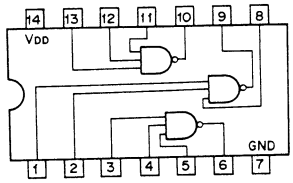


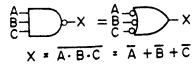


CD4023AE/BE (RCA)
TC4023BP (TOSHIBA)

C-MOS 3-INPUT NAND GATE

-TOP VIEW-



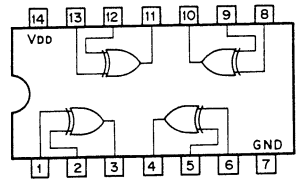


A	B	C	X
L	L	L	H
L	L	H	H
L	H	L	H
L	H	H	H
⋮	⋮	⋮	H
H	H	L	H
H	H	H	L

CD4030AE (RCA)

C-MOS EXCLUSIVE OR GATE

-TOP VIEW-

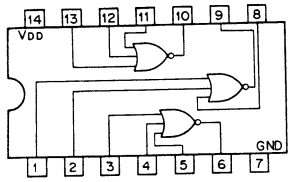


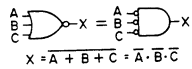
A	B	X
L	L	L
L	H	H
H	L	H
H	H	L

CD4025AE/BE (RCA)
TC4025BP (TOSHIBA)

C-MOS 3-INPUT NOR GATE

-TOP VIEW-



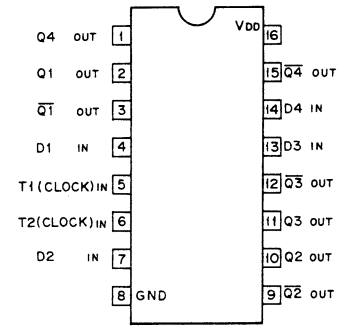


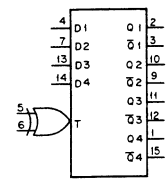
A	B	C	X
L	L	L	H
L	L	H	L
L	H	L	L
L	H	H	L
⋮	⋮	⋮	L
H	H	L	L
H	H	H	L

CD4042AE/BE (RCA)
F4042PC (FSC)
TC4042BP (TOSHIBA)

C-MOS D-TYPE LATCH

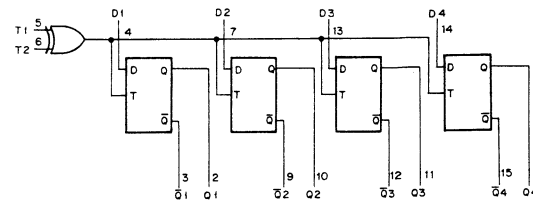
—TOP VIEW—





FUNCTION TABLE

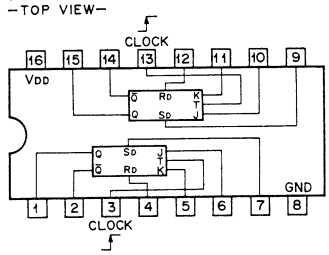
T1	T2	Q / Q̄
L	L	PASS DATA
L	H	LATCH DATA
H	L	LATCH DATA
H	H	PASS DATA



CD4027AE/BE (RCA)
TC4027BP (TOSHIBA)

C-MOS J-K MASTER SLAVE FLIP FLOP WITH DIRECT SET/RESET

-TOP VIEW-



DIRECT R-S FLIP FLOP

So	Rd	Q
L	L	Qn
L	H	L
H	L	H
H	H	L

J-K FLIP FLOP

tn	tn+1
J	K	Q
L	L	Qn
L	H	L
H	L	H
H	H	Q̄n

CLOCK T: ↓

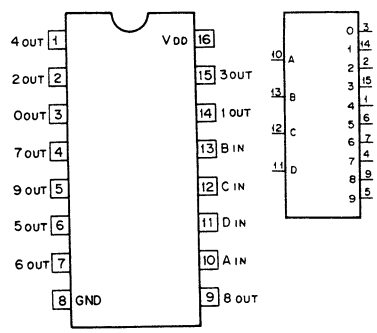
tn; BEFORE CLOCK

tn+1; AFTER CLOCK

CD4028AE (RCA)
TC4028BP (TOSHIBA)

C-MOS BCD TO DECIMAL DECODER

-TOP VIEW-



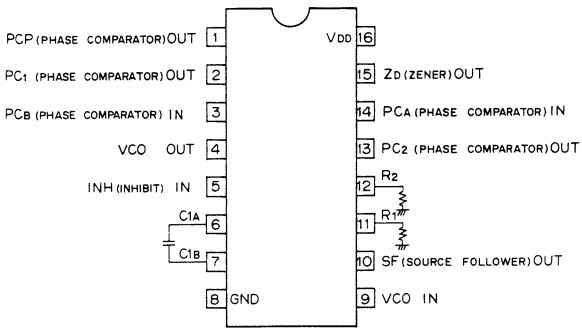
STATE	INPUTS				OUTPUTS									
	D	C	B	A	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
1	0	0	0	1	0	1	0	0	0	0	0	0	0	0
2	0	0	1	0	0	0	1	0	0	0	0	0	0	0
3	0	0	1	1	0	0	0	1	0	0	0	0	0	0
4	0	1	0	0	0	0	0	0	1	0	0	0	0	0
5	0	1	0	1	0	0	0	0	0	1	0	0	0	0
6	0	1	1	0	0	0	0	0	0	0	1	0	0	0
7	0	1	1	1	0	0	0	0	0	0	0	1	0	0
8	1	X	X	0	0	0	0	0	0	0	0	0	1	0
9	1	X	X	1	0	0	0	0	0	0	0	0	0	1

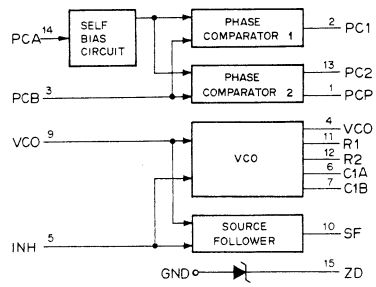
0; LOW

1; HIGH

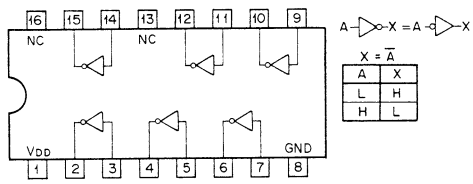
X; LOW OR HIGH

CD4046AE (RCA)
MC14046BCP (MOTOROLA)
C-MOS PHASE LOCKED LOOP
—TOP VIEW—

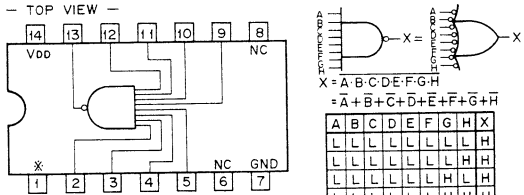




CD4049AE/BE (RCA)
TC4049BP (TOSHIBA)
μPD4049C (NEC)
C-MOS INVERTING TYPE BUFFER/CONVERTER
—TOP VIEW—

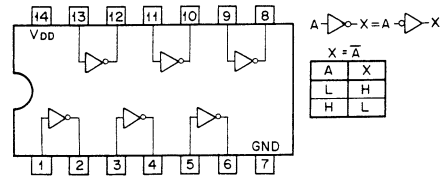


CD4068BE (RCA)
TC4068BP (TOSHIBA)
C-MOS 8-INPUT NAND GATE
— TOP VIEW —

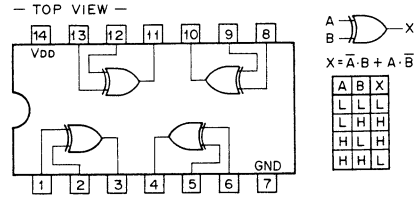


A	B	C	D	E	F	G	H	X
L	L	L	L	L	L	L	L	H
L	L	L	L	L	L	L	H	H
L	L	L	L	L	L	H	L	H
L	L	L	L	L	L	H	H	H
L	L	L	L	L	H	L	L	H
L	L	L	L	L	H	L	H	H
L	L	L	L	L	H	H	L	H
L	L	L	L	L	H	H	H	H
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
H	H	H	H	H	H	H	L	H
H	H	H	H	H	H	H	H	L

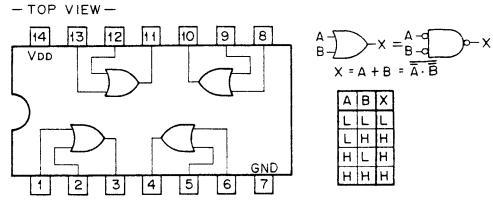
CD4069BE (RCA)
MSM4069 (OKI)
TC4069UBP (TOSHIBA)
C-MOS INVERTER
— TOP VIEW —



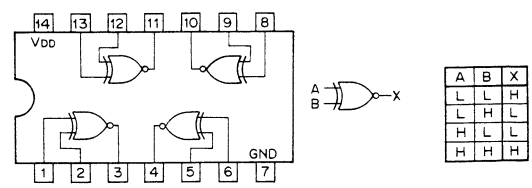
CD4070BE (RCA)
TC4030BP (TOSHIBA)
C-MOS EXCLUSIVE OR GATE
— TOP VIEW —



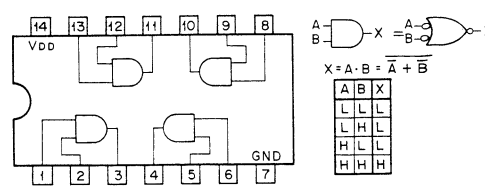
CD4071BE (RCA)
TC4071BP (TOSHIBA)
C-MOS 2-INPUT OR GATE
— TOP VIEW —



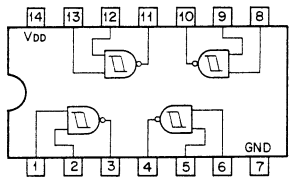
CD4077BE (RCA)
MC14077BCP (MOTOROLA)
C-MOS EXCLUSIVE NOR GATES
—TOP VIEW—

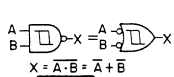


CD4081BE (RCA)
TC4081BP (TOSHIBA)
C-MOS 2-INPUT AND GATE
— TOP VIEW—

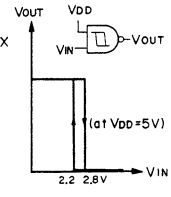


CD4093BE (RCA)
TC4093BP (TOSHIBA)
C-MOS 2-INPUT NAND SCHMITT TRIGGER
—TOP VIEW—

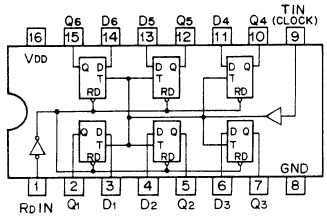


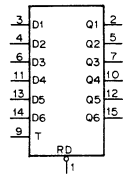


A	B	X
L	L	H
L	H	H
H	L	H
H	H	L



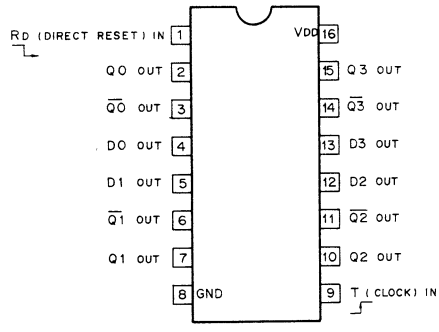
MC14174BCP (MOTOROLA)
CD40174BE (RCA)
TC40174BP (TOSHIBA)
C-MOS D-TYPE FLIP-FLOP
—TOP VIEW—

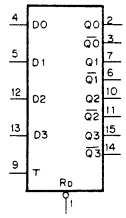




INPUTS			OUTPUT
T	D	RD	Q
↓	L	H	L
↓	H	H	H
↑	X	H	Q
X	X	L	L

MC14175BCP (MOTOROLA)
F40175PC (FSC)
TC40175BP (TOSHIBA)
C-MOS D-TYPE FLIP-FLOP
-TOP VIEW-

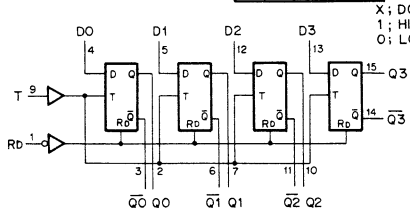




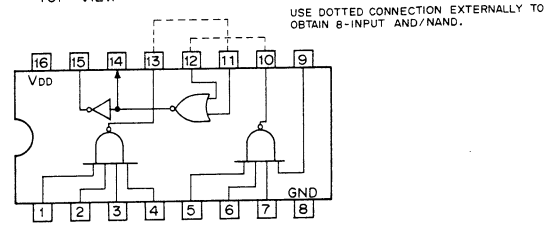
T	D	RD	Q	Q̄
↓	0	1	0	1
↓	1	1	1	0
↑	X	1	Q	Q̄
X	X	0	0	1

NO CHANGE

X; DON'T CARE
1; HIGH LEVEL
0; LOW LEVEL

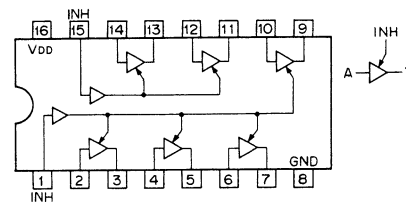


MC14501CP (MOTOROLA)
C-MOS DUAL 4-INPUT "NAND" GATE
2-INPUT "NOR/OR" GATE
(8-INPUT "AND/NAND" GATE)
—TOP VIEW—



NOTO; PIN 14 MUST NOT BE USED AS AN INPUT TO THE INVERTER.

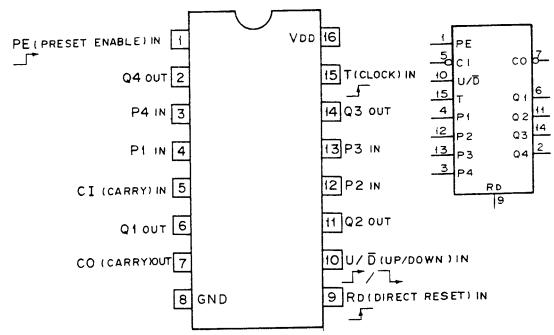
MC14503BCP (MOTOROLA)
C-MOS NON-INVERTING 3-STATE BUFFER
—TOP VIEW—



A	INH	Y
0	0	0
1	0	1
X	1	OPEN

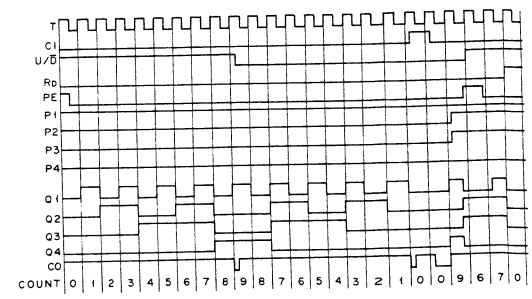
X=DON'T CARE
0=LOW LEVEL
1=HIGH LEVEL

MC14510BCP (MOTOROLA)
CD4510BE (RCA)
TC4510BP (TOSHIBA)
C-MOS PRESETTABLE BCD UP/DOWN COUNTOR
—TOP VIEW—



T	RD	PE	CI	U/D	FUNCTION
X	1	X	X	X	RESET TO ZERO
X	0	1	X	X	SET TO P1,P2,P3,P4
↓	0	0	0	1	COUNT UP
↓	0	0	0	0	COUNT DOWN
↑	0	0	X	X	NO CHANGE
X	0	0	1	X	NO CHANGE

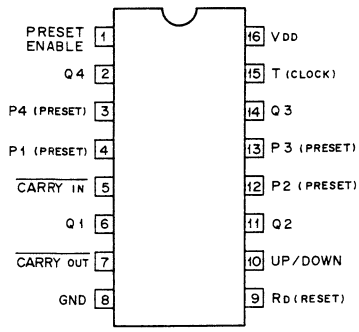
X = DON'T CARE
1 = HIGH LEVEL
0 = LOW LEVEL

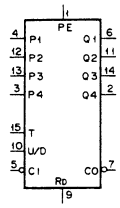


MC14516BCP (MOTOROLA)
CD4516BE (RCA)
TC4516BP (TOSHIBA)

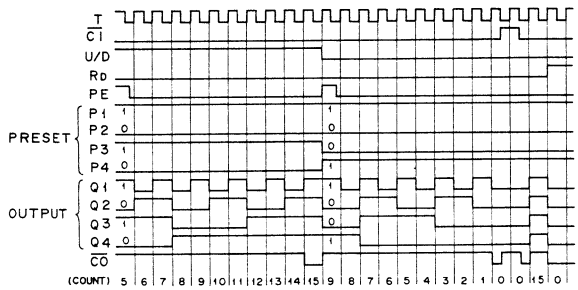
C-MOS PRESETTABLE BINARY UP/DOWN COUNTER

— TOP VIEW —





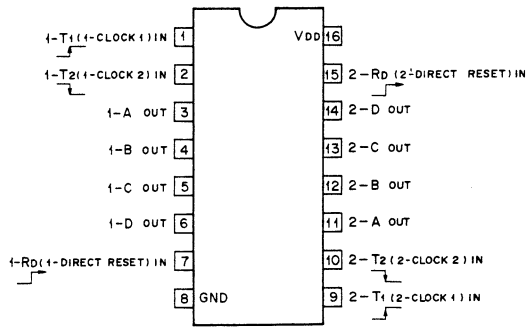
T	CI	U/D	PE	RD	MODE
X	H	X	L	L	NO COUNT
↓	L	H	L	L	UP COUNT
↓	L	L	L	L	DOWN COUNT
X	X	X	H	L	PRESET
X	X	X	X	H	RESET



MC14520BCP (MOTOROLA)
TC4520BP (TOSHIBA)

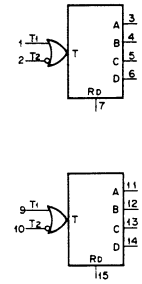
C-MOS DUAL 4-BIT BINARY COUNTER

— TOP VIEW —



STATE	OUTPUTS			
	D	C	B	A
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

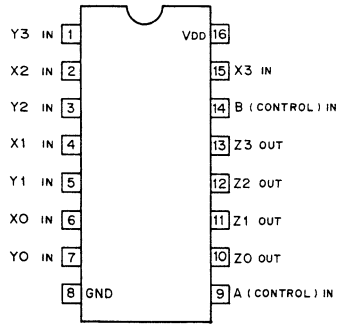
0; LOW
1; HIGH

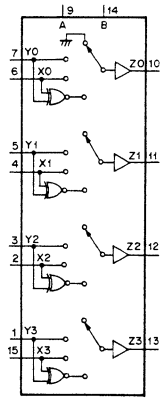


MC14519CP (MOTOROLA)
μPD4519A (NEC)
TP4519A (TI)

C-MOS 4-BIT AND / OR SELECTOR
2-CHANNEL DATA SELECTOR
EXCLUSIVE "NOR" GATE

— TOP VIEW —



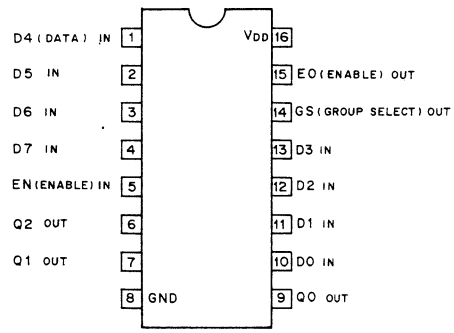


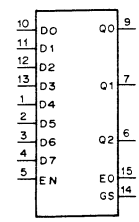
CONTROL		OUTPUT
A	B	Z
L	L	GND
L	H	Y
H	L	X
H	H	⊕

MC14532BCP (MOTOROLA)
CD4532BE (RCA)
TC4532BP (TOSHIBA)

C-MOS 8-BIT PRIORITY ENCODER

—TOP VIEW—

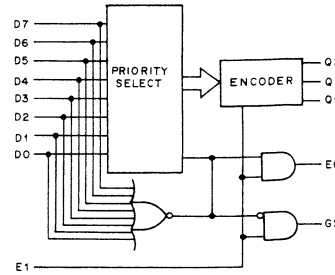




D7 IS THE HIGHEST PRIORITY

INPUTS									OUTPUTS				
EN	D7	D6	D5	D4	D3	D2	D1	DO	GS	Q2	Q1	QO	EO
0	X	X	X	X	X	X	X	X	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	1
1	1	X	X	X	X	X	X	X	1	1	1	1	0
1	0	1	X	X	X	X	X	X	1	1	1	0	0
1	0	0	1	X	X	X	X	X	1	1	0	1	0
1	0	0	0	1	X	X	X	X	1	1	0	0	0
1	0	0	0	0	1	X	X	X	1	0	1	1	0
1	0	0	0	0	0	1	X	X	1	0	1	0	0
1	0	0	0	0	0	0	1	X	1	0	0	1	0
1	0	0	0	0	0	0	0	1	1	0	0	0	0

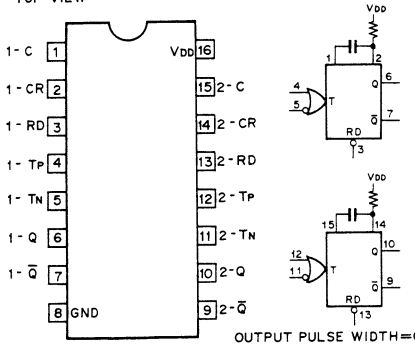
H: HIGH LEVEL
L: LOW LEVEL
X: DON'T CARE



MC14538BCP (MOTOROLA)

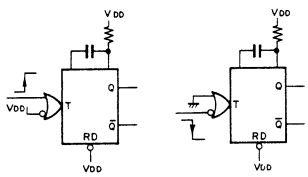
C-MOS DUAL RETRIGGERABLE/NON-RETRIGGERABLE MONOSTABLE MULTIVIBRATOR

-TOP VIEW-

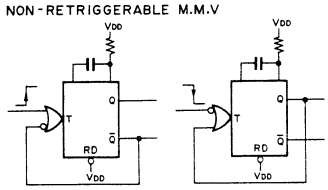


OUTPUT PULSE WIDTH=CR

RETRIGGERABLE M.M.V



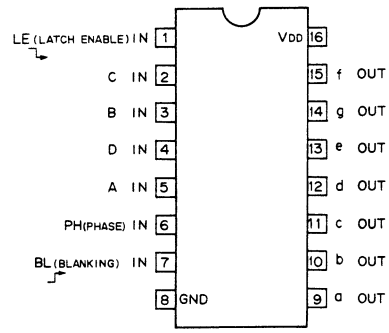
NON-RETRIGGERABLE M.M.V

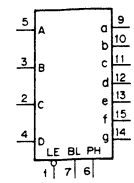


MC14543BCP (MOTROLA)
TC4543BP (TOSHIBA)

C-MOS BCD-TO-SEVEN-SEGMENT LATCH / DECODER / DRIVER

—TOP VIEW —





INPUTS						OUTPUTS							DISPLAY
BL	PH*	D	C	B	A	a	b	c	d	e	f	g	
1	0	X	X	X	X	0	0	0	0	0	0	0	BLANK
0	0	0	0	0	0	1	1	1	1	1	1	0	0
0	0	0	0	0	1	0	1	1	0	0	0	0	1
0	0	0	0	1	0	1	1	0	1	1	0	1	2
0	0	0	0	1	1	1	1	1	1	0	0	1	3
0	0	0	1	0	0	0	1	1	0	0	1	1	4
0	0	0	1	0	1	1	0	1	1	0	1	1	5
0	0	0	1	1	0	1	0	1	1	1	1	1	6
0	0	0	1	1	1	1	1	1	0	0	0	0	7
0	0	1	0	0	0	1	1	1	1	1	1	1	8
0	0	1	0	0	1	1	1	1	1	0	1	1	9
**	1	* *				INVERSE OF OUTPUT CONBINATIONS ABOVE							DISPLAY AS ABOVE

0: LOW LEVEL
1: HIGH LEVEL
X: DON'T CARE

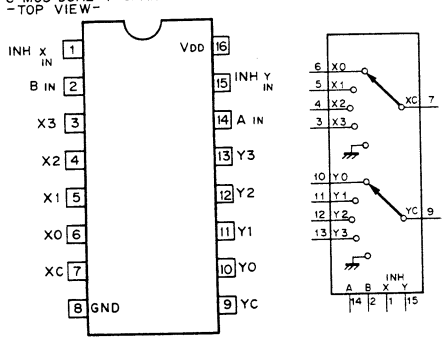
* = FOR LIQUID CRYSTAL READOUTS, APPLY A SQUARE WAVE TO PH.
FOR COMMON CATHODE LED READOUTS, SELECT PH = 0 (LOW).
FOR COMMON ANODE LED READOUTS, SELECT PH = 1 (HIGH).

** = ABOVE COMBINATIONS.

MC14539BCP (MOTOROLA)
TC4539BP (TOSHIBA)

C-MOS DUAL 4-CHANNEL DATA SELECTOR/MULTIPLEXER

-TOP VIEW-



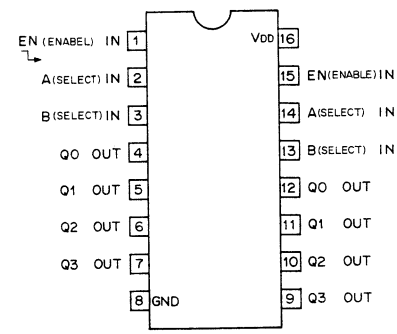
CONT. INPUTS				
INH X / INH Y	B	A	Xc	Yc
0	0	0	X0	Y0
0	0	1	X1	X1
0	1	0	X2	X2
0	1	1	X3	X3
1	X	X	GND	GND

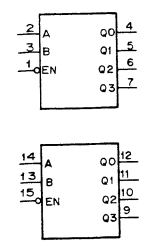
0; LOW LEVEL
1; HIGH LEVEL
X; LOW OR HIGH

MC14555BCP (MOTOROLA)
CD4555BE (RCA)
TC4555BP (TOSHIBA)

C-MOS BINARY TO 1-OF-4 DECODER / DEMULTIPLEXER

—TOP VIEW—





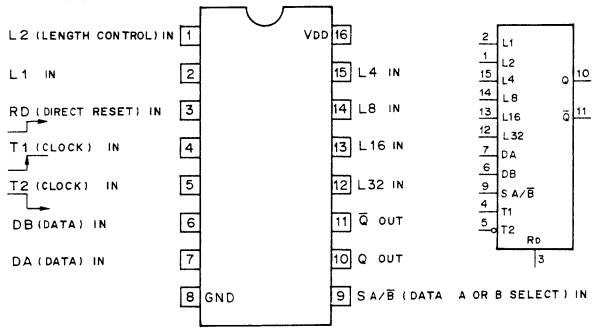
INPUTS			OUTPUTS			
EN	A	B	Q3	Q2	Q1	Q0
0	0	0	0	0	0	1
0	0	1	0	0	1	0
0	1	0	0	1	0	0
0	1	1	1	0	0	0
1	X	X	0	0	0	0

X = DON'T CARE
0 = LOW LEVEL
1 = HIGH LEVEL

MC14557BCP (MOTOROLA)

C-MOS 1-TO-64-BIT VARIABLE LENGTH SHIFT REGISTER

—TOP VIEW—



LENGTH SELECT TRUTH TABLE

L32	L16	L8	L4	L2	L1	REGISTER LENGTH
0	0	0	0	0	0	1-BIT
0	0	0	0	0	1	2-BIT
0	0	0	0	1	0	3-BIT
0	0	0	0	1	1	4-BIT
0	0	0	1	0	0	5-BIT
⋮	⋮	⋮	⋮	⋮	⋮	⋮
1	1	1	1	0	0	61-BIT
1	1	1	1	0	1	62-BIT
1	1	1	1	1	0	63-BIT
1	1	1	1	1	1	64-BIT

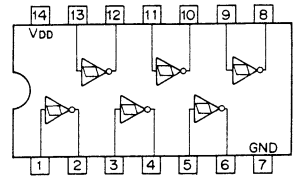
INPUTS				OUTPUT
RD	SA/B̄	T1	T2	Q
0	0	⌐	0	DB
0	1	⌐	0	DA
0	0	1	⌐	DB
0	1	1	⌐	DA
1	X	X	X	0

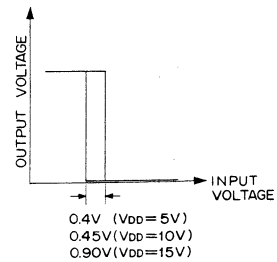
0 ; LOW
1 ; HIGH
X ; DON'T CARE

MC14584BCP (MOTOROLA)

C-MOS SCHMITT TRIGGER INVERTER

—TOP VIEW—

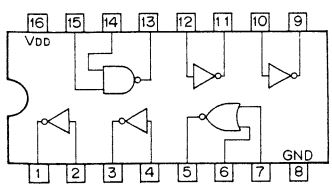




MC14572CP (MOTOROLA)

C-MOS INVERTER / NOR GATE / NAND GATE

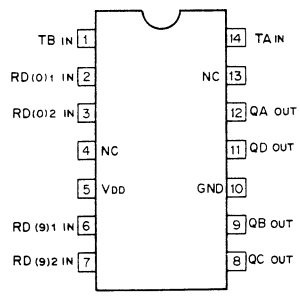
—TOP VIEW—

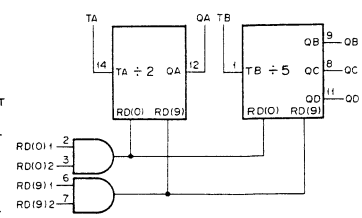


MM74C90N (NSC)

C-MOS DIVIDE-BY-TWO AND DIVIDE-BY-5 COUNTER

-TOP VIEW-





BCD COUNT SEQUENCE

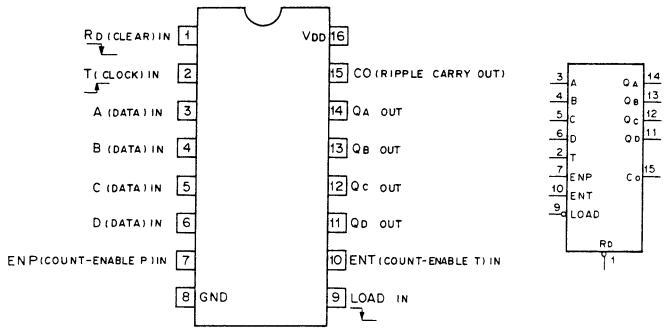
COUNT	OUTPUT			
	QD	QC	QB	QA
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1

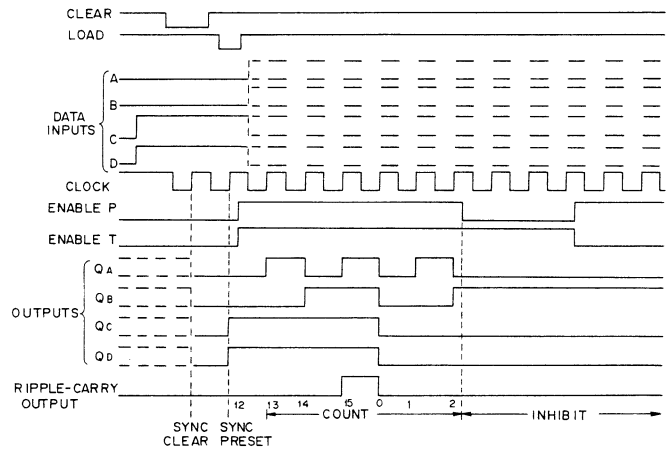
OUTPUT QA IS CONNECTED TO INPUT TB

RESET/COUNT FUNCTION TABLE

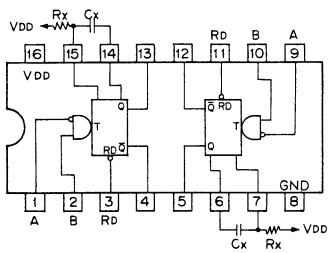
RESET INPUT				OUTPUT			
R(0)1	R(0)2	R(9)1	R(9)2	QD	QC	QB	QA
1	1	0	X	0	0	0	0
1	1	X	0	0	0	0	0
X	X	1	1	1	0	0	1
X	0	X	0	COUNT			
0	X	0	X	COUNT			
0	X	X	0	COUNT			
X	0	0	X	COUNT			

MM74C163N (NEC)
C-MOS SYNCHRONOUS 4-BIT BINARY COUNTER
—TOP VIEW—





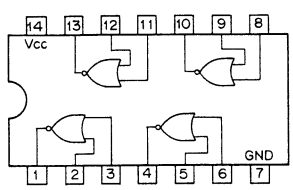
MM74C221N (NSC)
C-MOS DUAL MONOSTABLE MULTIVIBRATOR
— TOP VIEW —

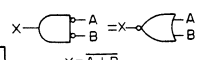


INPUTS			OUTPUTS	
RD	A	B	Q	$\overline{Q}$
L	X	X	L	H
X	H	X	L	H
X	X	L	L	H
H	L	↓	⊓	⊔
H	⊔	H	⊓	⊔

$T_W = C_x \cdot R_x$

SN74LS02N (TI) SN7402N (TI)
SN74S02 (TI)
TTL 2-INPUT POSITIVE-NOR GATE
— TOP VIEW —

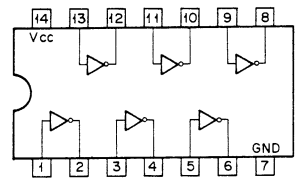


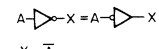


A	B	X
0	0	1
0	1	0
1	0	0
1	1	0

0: LOW LEVEL
1: HIGH LEVEL

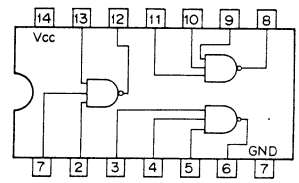
SN74LS04N (TI) SN7404N (TI)
M53204P (MITSUBISHI)
TTL INVERTER
—TOP VIEW—

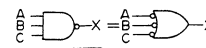




A	X
L	H
H	L

SN7410N, SN74LS10N (TI)
TTL 3-INPUT POSITIVE NAND GATE
— TOP VIEW —

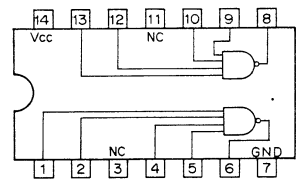


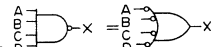


A	B	C	X
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	0

0: LOW LEVEL
1: HIGH LEVEL

SN74LS20N (TI) SN7420N (TI)
TTL 4-INPUT POSITIVE NAND GATE
— TOP VIEW —

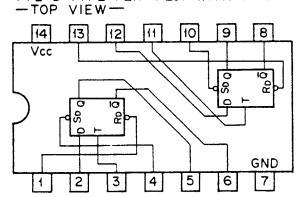




A	B	C	D	X
0	0	0	0	1
0	0	0	1	1
0	0	1	0	1
0	0	1	1	1
0	1	0	0	1
⋮	⋮	⋮	⋮	⋮
1	1	0	1	1
1	1	1	0	1
1	1	1	1	0

0 ; LOW LEVEL
1 ; HIGH LEVEL

SN74LS74N (TI) SN7474N (TI)
M53274P (MITSUBISHI)
TTL D-TYPE FLIP FLOP WITH DIRECT SET/RESET
—TOP VIEW—



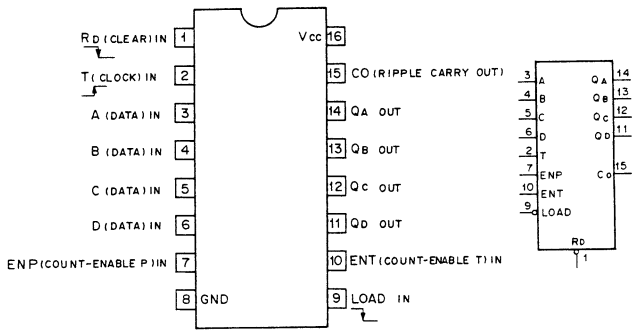
INPUTS				OUTPUTS	
$\overline{Sd}$	$\overline{Rd}$	T	D	Qn+1	$\overline{Qn+1}$
L	H	X	X	H	L
H	L	X	X	L	H
L	L	X	X	H*	H*
H	H	⌐	H	H	L
H	H	⌐	L	L	H
H	H	L	X	Qn	$\overline{Qn}$

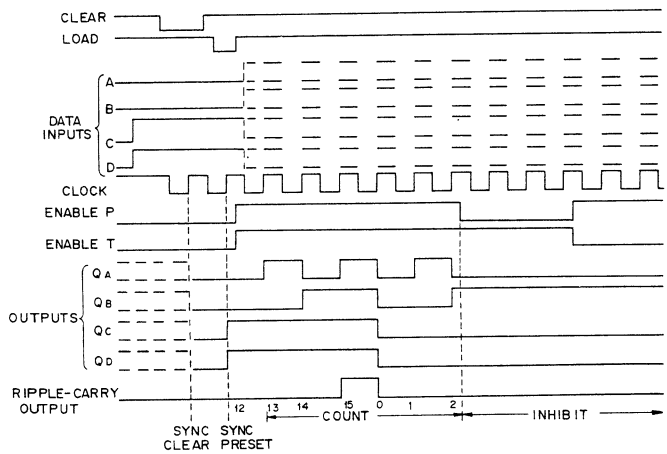
* UNSTABLE

SN74LS163N (TI) SN74163N (TI)

TTL SYNCHRONOUS 4-BIT BINARY COUNTER

—TOP VIEW—

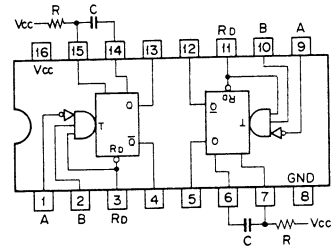




SN74LS221N (TI) SN74221N (TI)

TTL MONOSTABLE MULTIVIBRATOR

—TOP VIEW—



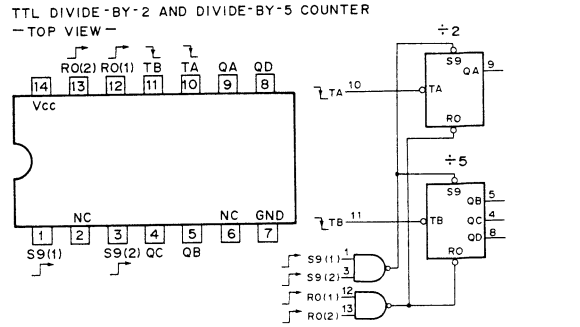
INPUTS			OUTPUTS	
RD	A	B	Q	$\overline{Q}$
L	X	X	L	H
X	H	X	L	H
X	X	L	L	H
H	L	↑	⌐	⌐
H	↓	H	⌐	⌐
↑	L	H	⌐	⌐

OUTPUT PULSE WIDTH = 0.7CR

SN74290N (TI)
SN74LS290N (TI)

TTL DIVIDE-BY-2 AND DIVIDE-BY-5 COUNTER

—TOP VIEW—



COUNT SEQUENCE

÷2 SECTION

COUNT	QA
0	0
1	1

÷5 SECTION

COUNT	QD	QC	QB
0	0	0	0
1	0	0	1
2	0	1	0
3	0	1	1
4	1	0	0

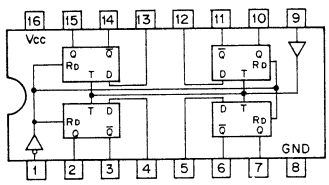
SET/RESET/COUNT FUNCTION

SET/RESET IN				OUTPUTS			
R0(1)	R0(2)	S9(1)	S9(2)	QD	QC	QB	QA
1	1	0	X	0	0	0	0
1	1	X	0	0	0	0	0
X	X	1	1	1	0	0	1
X	0	X	0	COUNT			
0	X	0	X	COUNT			
0	X	X	0	COUNT			
X	0	0	X	COUNT			

SN74175N, SN74LS175N (TI)

TTL D-TYPE FLIP-FLOP WITH CLEAR

—TOP VIEW—



RD	T	D	Q	$\overline{Q}$
L	X	X	L	H
H	↑	H	H	L
H	↑	L	L	H
H	L	X	Q_0	$\overline{Q}_0$

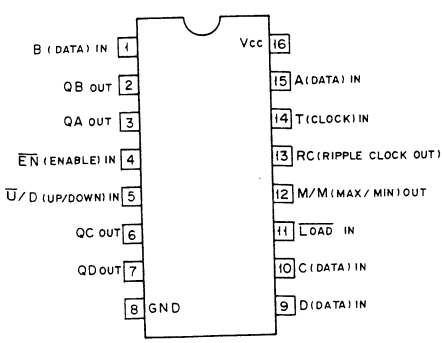
X = DON'T CARE

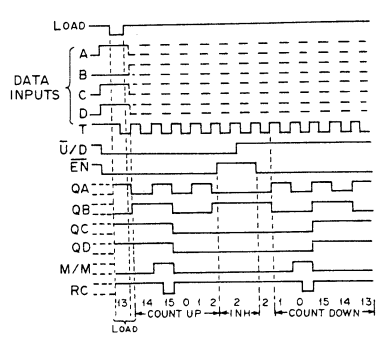
Q_0 = THE LEVEL OF Q BEFORE THE INDICATED STEADY-STATE INPUT CONDITIONS WERE ESTABLISHED.

SN74191N, SN74LS191N (TI)

TTL SYNCHRONOUS UP/DOWN BINARY COUNTER

—TOP VIEW—

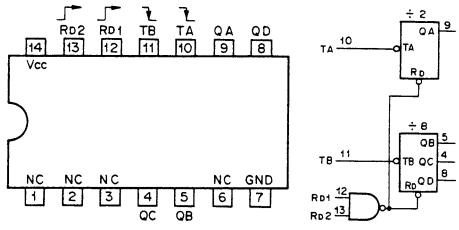


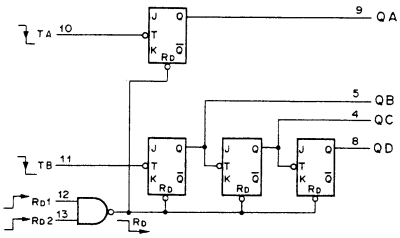


SN74293N (TI)
SN74LS293N (TI)

TTL 1-BIT AND 3-BIT BINARY COUNTER

—TOP VIEW—





COUNT SEQUENCE

÷2 SECTION

COUNT	QA
0	0
1	1

÷8 SECTION

COUNT	QD	QC	QB
0	0	0	0
1	0	0	1
2	0	1	0
3	0	1	1
4	1	0	0
5	1	0	1
6	1	1	0
7	1	1	1

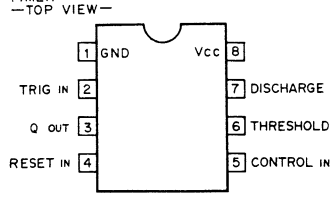
RESET/COUNT FUNCTION

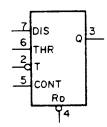
RESET IN		OUTPUTS			
RD1	RD2	QD	QC	QB	QA
1	1	0	0	0	0
X	0	COUNT			
0	X	COUNT			

NE555N (SIGNETICS)
M51841P (MITSUBISHI)

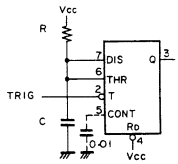
TIMER

—TOP VIEW—

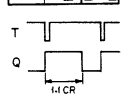




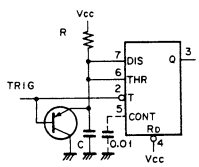
MONOSTABLE MULTIVIBRATOR



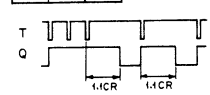
INPUTS		OUT
RD	T	Q
L	X	L
H	⌐	⌐⌐



RETIRIGGERABLE MONO. MULTIVIBRATOR
(MISSING PULSE DETECTOR)



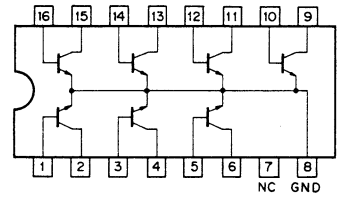
INPUTS		OUT
RD	T	Q
L	X	L
H	⌐	⌐⌐



M54515P (MITSUBISHI)

TRANSISTOR ARRAY

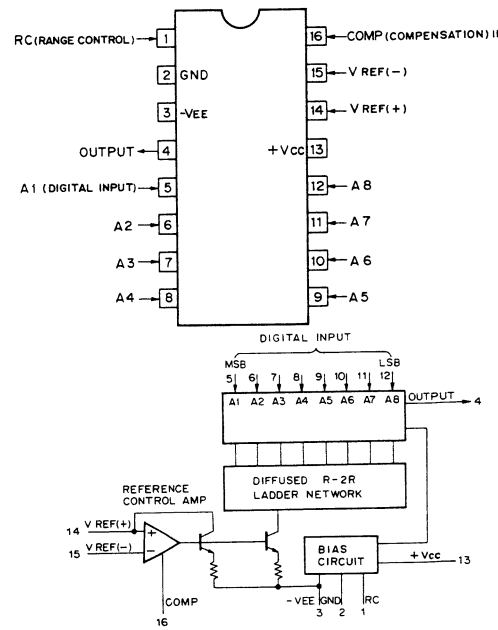
—TOP VIEW—



DAC-IC88C (DATEL)

8-BIT DIGITAL-TO-ANALOG CONVERTER

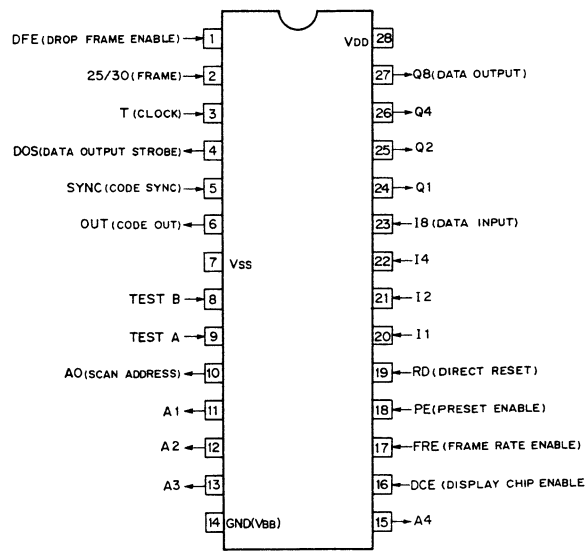
—TOP VIEW—



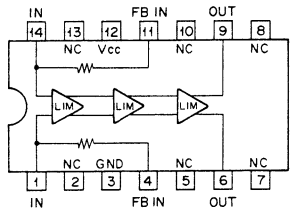
EECO 5200 (EECO)

C-MOS SMPTE/EBU TIME CODE GENERATOR

—TOP VIEW—



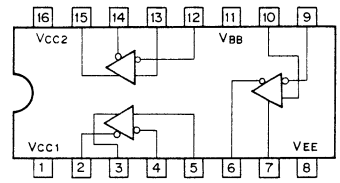
CX034 (SONY)
3-STAGE LIMITER
— TOP VIEW —



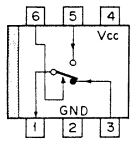
MC10116L (MOTOROLA)
HD10116 (HITACHI)

DIFFERENTIAL OR/NOR LINE RECEIVER

-TOP VIEW-



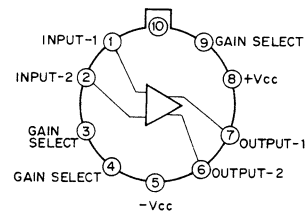
CX130 (SONY)
ANALOG SWITCH
— TOP VIEW —



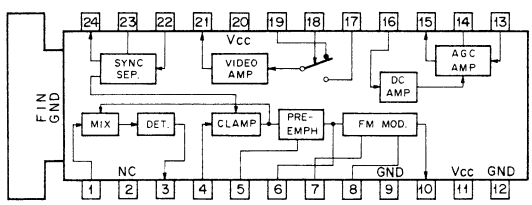
CONT. INPUT (PIN6)	SW
LOW OR OPEN	
HIGH	

NE592K (SIGNETICS)
VIDEO AMPLIFIER

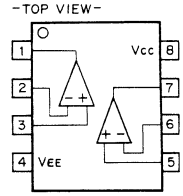
-TOP VIEW-



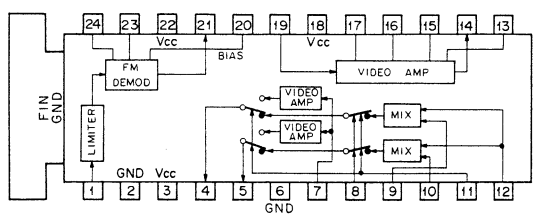
CX131A (SONY)
— TOP VIEW —



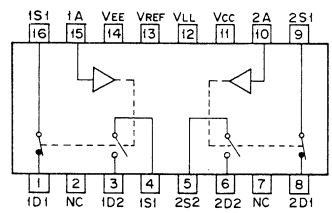
TL082CP (TI)
DUAL OP AMPLIFIER
-TOP VIEW-



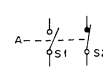
CX135 (SONY)
— TOP VIEW —



TL191 (TI)
TWIN DUAL COMPLEMENTARY
BI-MOS ANALOG SWITCHER
— TOP VIEW —



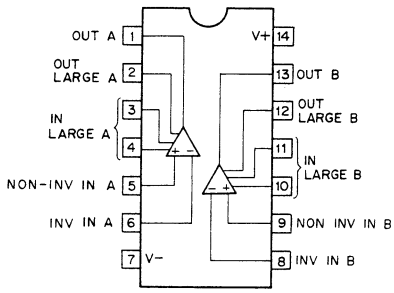
A	S1	S2
H	ON	OFF
L	OFF	ON



μA749PC (FSC)

AUDIO OPERATIONAL AMPLIFIER
AUDIO PREAMPLIFIER

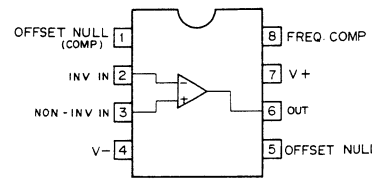
-TOP VIEW-



μA301AT (FSC)
μPC301AC (NEC)
LM301AN (NSC)
MLM301AP (MOTOROLA)
SN72301AP(TI)

OPERATIONAL AMPLIFIER

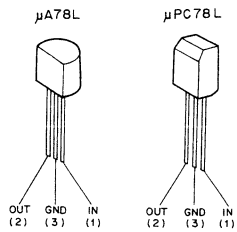
-TOP VIEW-



μA78L05AV (FSC)
μPC78L05A (NEC)

3-TERMINAL POSITIVE REGULATOR

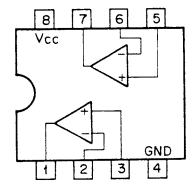
+5V : UP TO 100mA



LM1458N (NSC)
HA17458GS (HITACHI)
μPC1458C (NEC)

OPERATIONAL AMPLIFIER

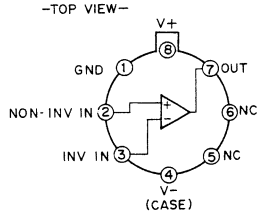
- TOP VIEW -



μA710HC (FSC)
μPC71A (NEC)
LM710C (NSC)
MC1710 (MOTOROLA)
SN72710 (TI)

HIGH SPEED VOLTAGE COMPARATOR

-TOP VIEW-



SECTION 16
SPARE PARTS AND JIG

16-1 PARTS INFORMATION

1. **Safety Related Component Warning**

   Components identified by shading on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose part numbers appear as shown in this manual or in service bulletins and service manual supplements published by Sony.

2. Replace Parts that are supplied from Sony Parts Center can sometimes have different shape and external appearance than what are actually used in equipment. This is due to **"accomodating the improved parts and/or engineering changes"** or **"standardization of genuine parts"**.

   - This manul's exploded views and electrical spare parts lists are indicating the parts numbers of "the standardized genuine parts at present".
   - Regarding engineering parts changes in our engineering dapartment, refer Sony service bulletins and service manual supplements.

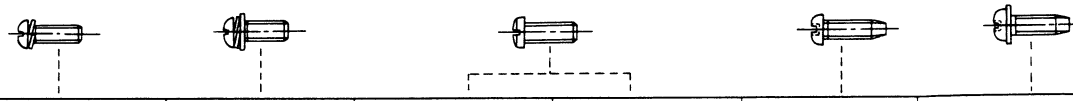
3. **Printed Components in Bold-Face type** on the exploded views and electrical spare parts list are normally stocked for replacement purposes. The remaining parts are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

4. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

5. (T) after a spring description is shown on the exploded views in order to indicate the number of a spring turn required for the use.

   (Example) Spring, tension (24T); This spring must be cut at its 24th turn for actual use.

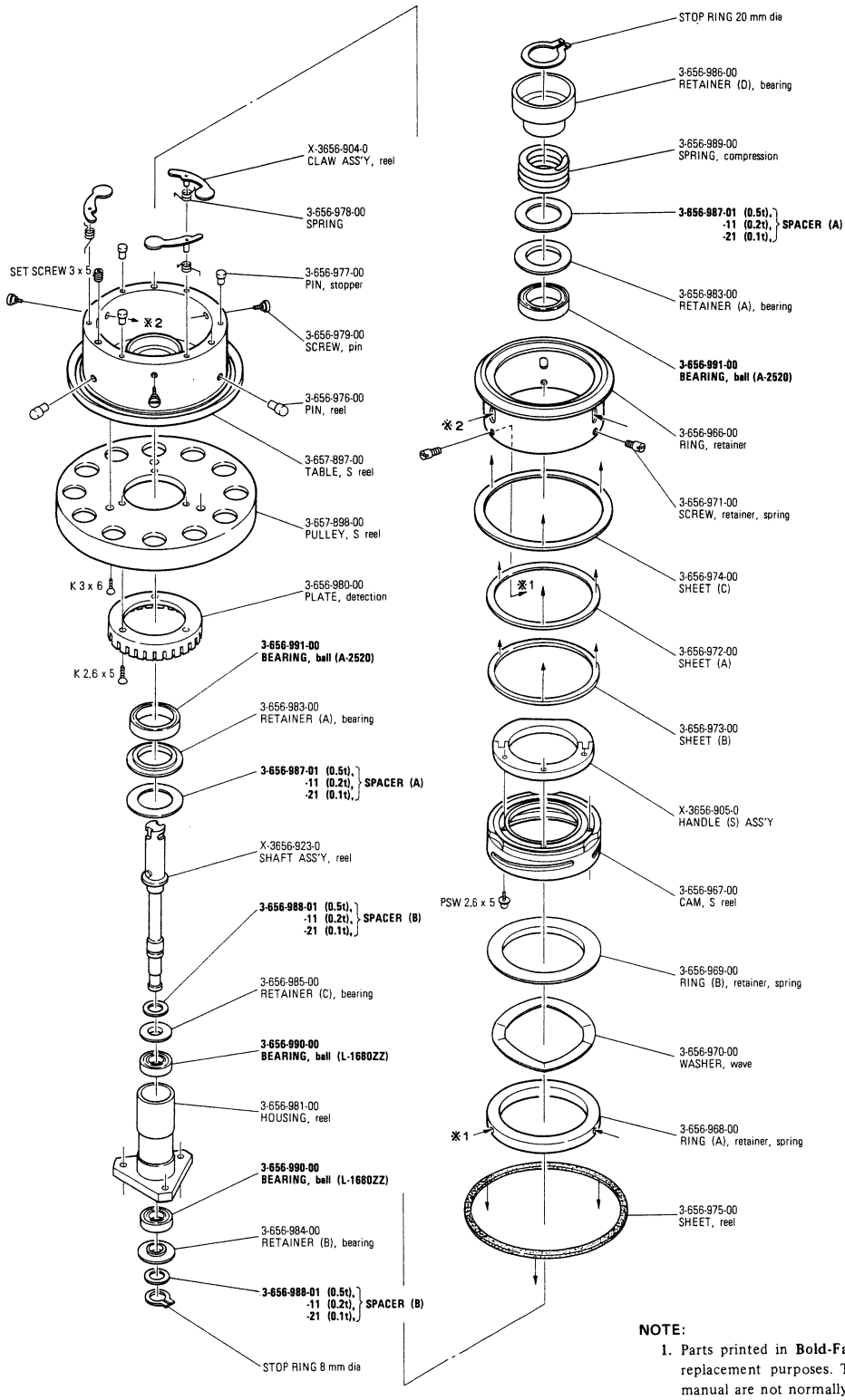
6. Screws
   - All the screws used in this machine are the TOTSU type unless otherwise noted. The screws are interchangeable with the Phillips type (⊕) and slotted type (⊖) screws.
   - Please order as the following part number when ordering the TOTSU type screws.



Size	PS	PSW	B (BZnN)	B (Cr-N)	PTT	PTTWH
2.6 x 4	7-621-972-05	———	7-621-912-10	7-621-912-18	———	———
2.6 x 6	7-621-972-25	———	7-621-912-30	7-621-912-38	———	———
2.6 x 8	7-621-972-35	———	7-621-912-40	7-621-912-48	———	———
2.6 x 10	7-621-972-45	———	7-621-912-50	7-621-912-58	———	———
2.6 x 12	7-621-972-55	———	7-621-912-60	7-621-912-68	———	———
3 x 6	7-686-447-01	7-686-527-01	7-686-624-09	7-686-624-04	7-687-411-31	7-687-510-31
3 x 8	7-686-448-01	7-686-528-01	7-686-625-09	7-686-625-04	7-687-412-31	7-687-511-31
3 x 10	7-686-449-01	7-686-529-01	7-686-626-09	7-686-626-04	7-687-413-31	7-687-512-31
3 x 12	7-686-450-01	7-686-530-01	7-686-627-09	7-686-627-04	———	———
3 x 16	7-686-452-01	7-686-532-01	7-686-629-09	7-686-629-04	———	———
3 x 25	7-686-454-01	7-686-534-01	7-686-631-09	7-686-631-04	———	———
4 x 8	7-686-468-01	———	———	7-686-635-04	———	———
4 x 12	7-686-470-01	———	———	7-686-637-04	———	———
4 x 14	7-686-471-01	———	———	7-686-638-04	———	———
4 x 16	7-686-472-01	———	———	7-686-639-04	———	———
4 x 20	7-686-473-01	———	———	7-686-640-04	———	———

16-2 EXPLODED VIEW

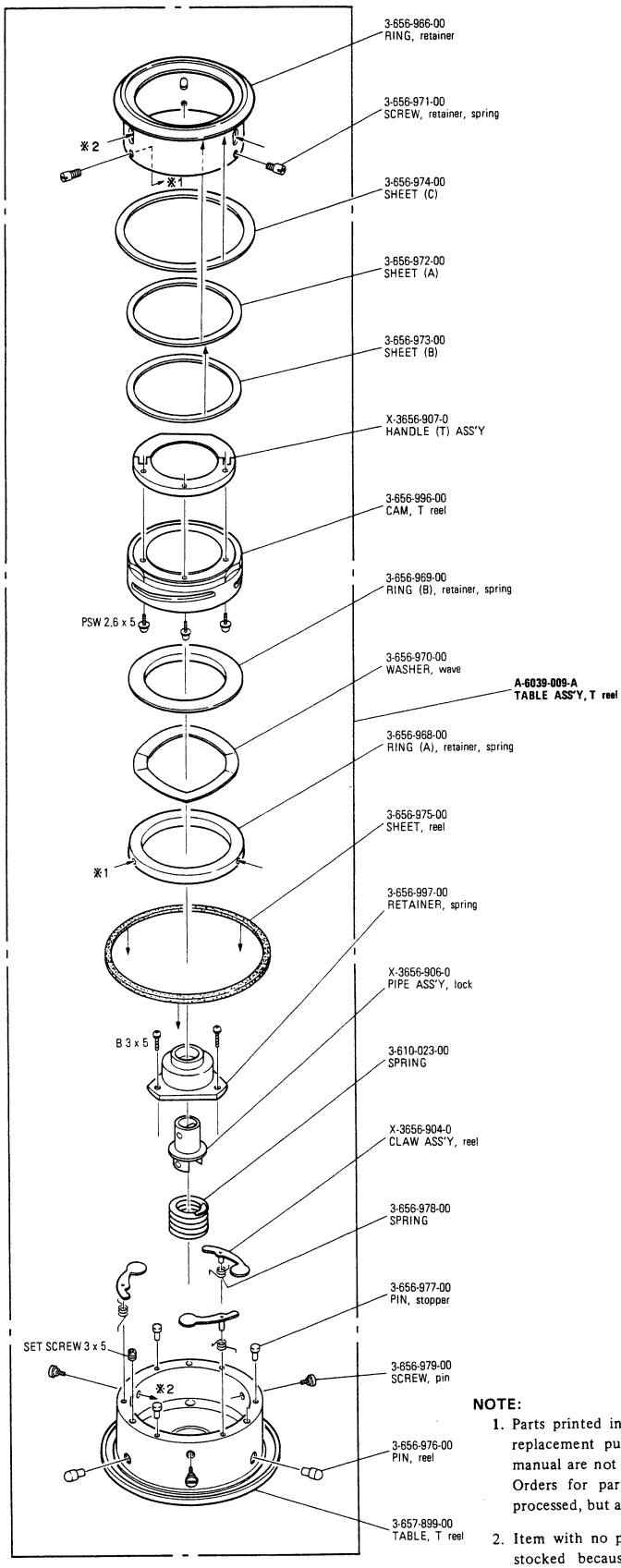
Reel Table Block (1).....supply side reel table



NOTE:

1. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
2. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

Reel Table Block (2).....take-up side reel table



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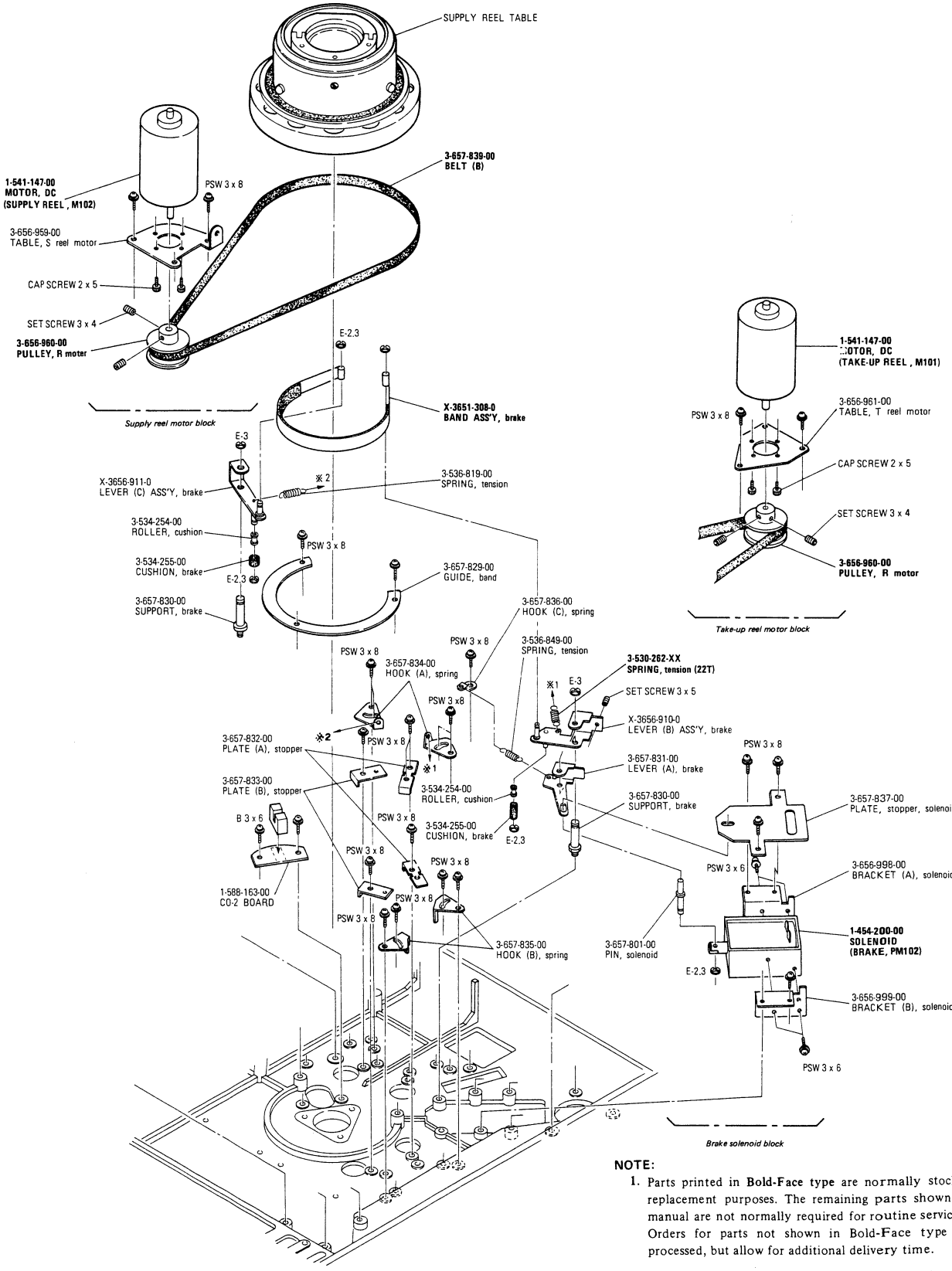
Link Block (1).....supply side reel brake and reel motor



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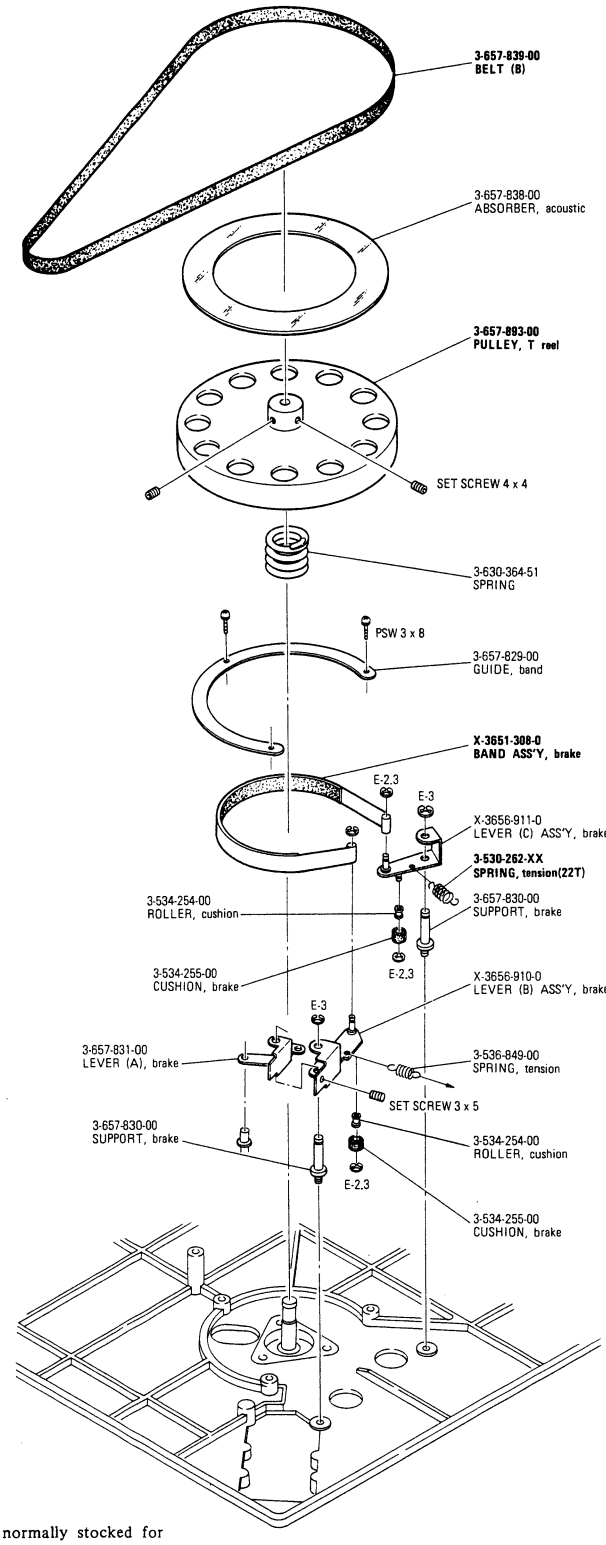
Link Block (2).....take-up side reel brake



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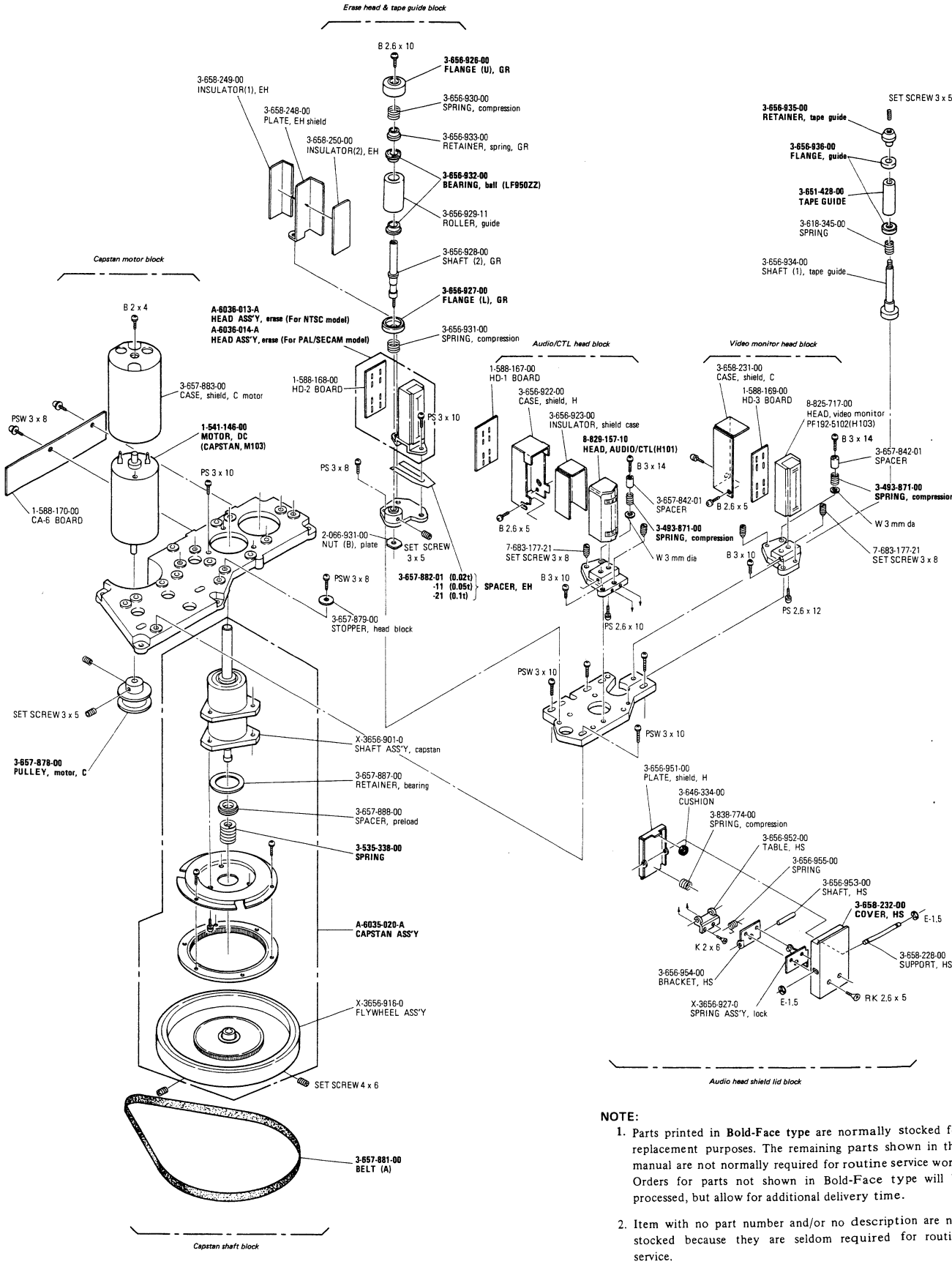
Driving System Block (1).....capstan and heads



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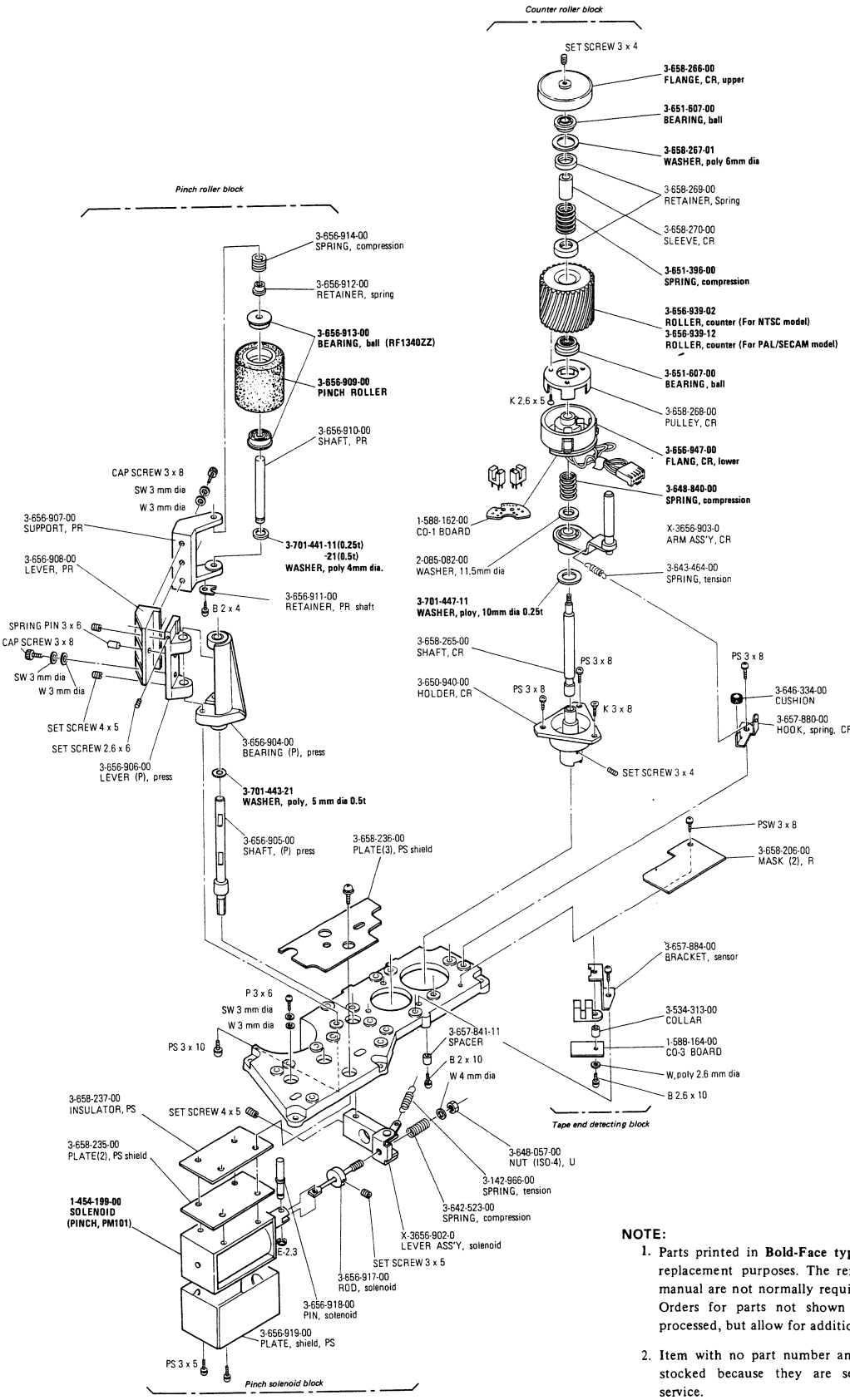
Driving System Block (2).....pinch roller and counter roller



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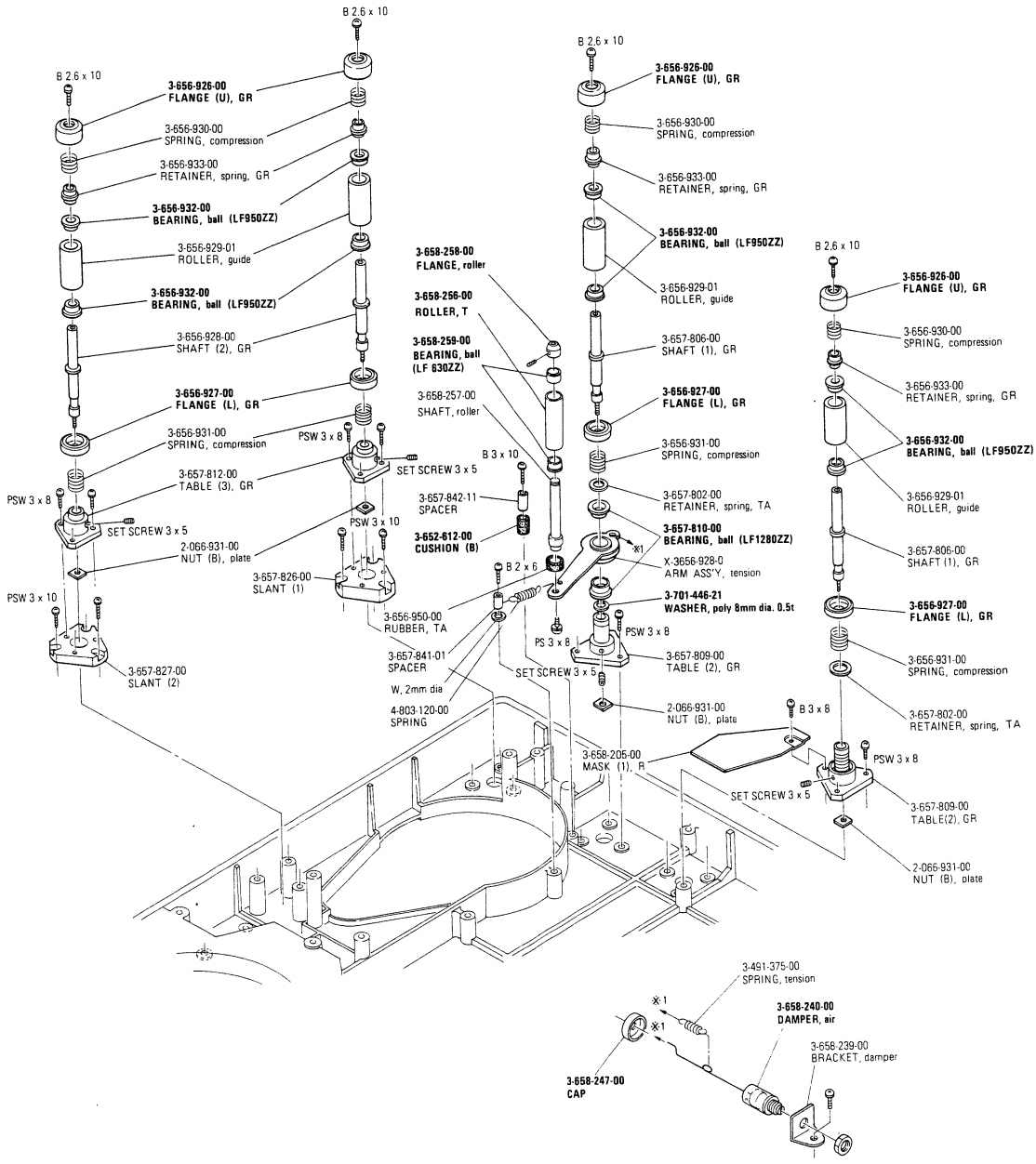
Tape Guides Block



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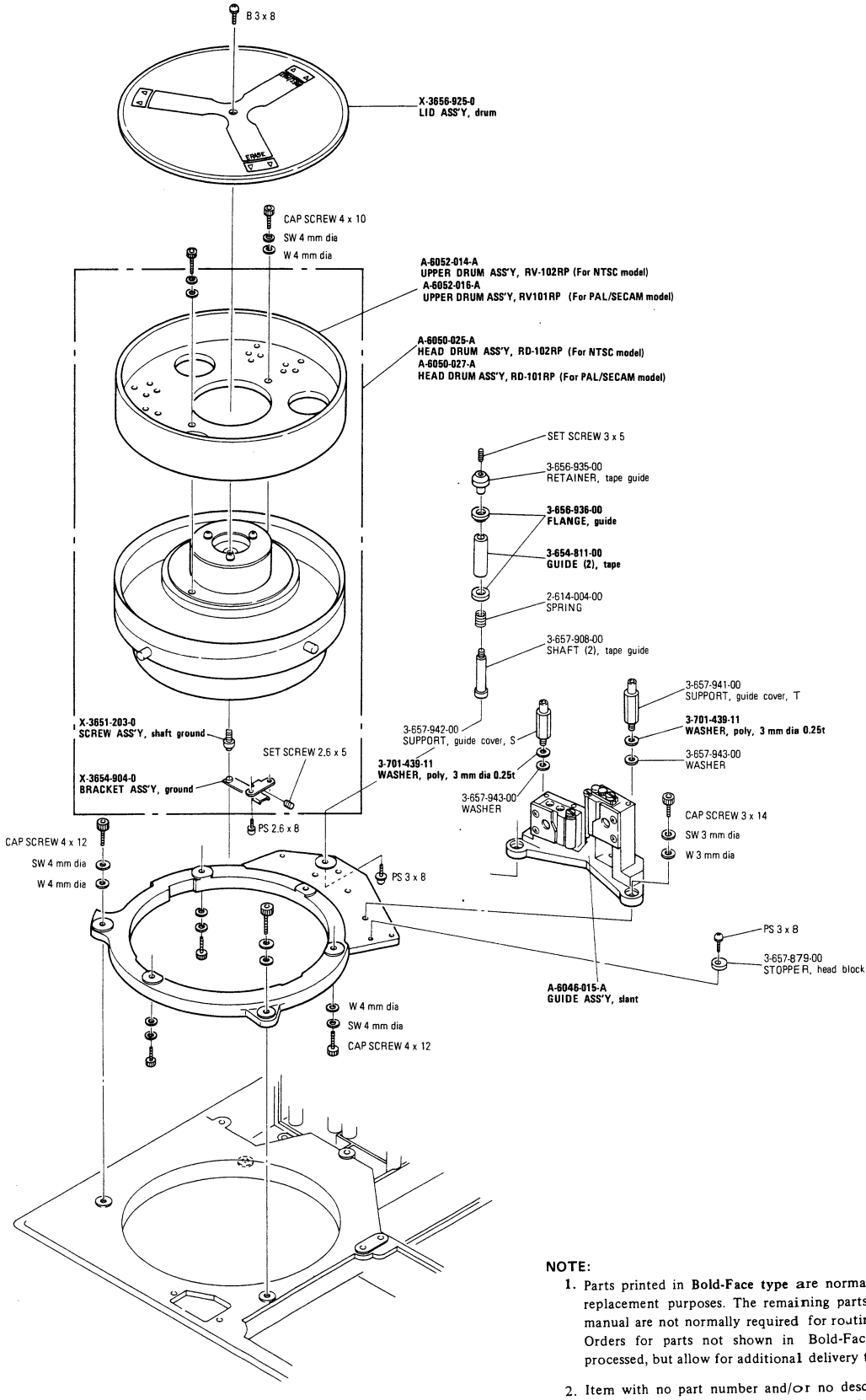
Head Drum and Slant Guide Block



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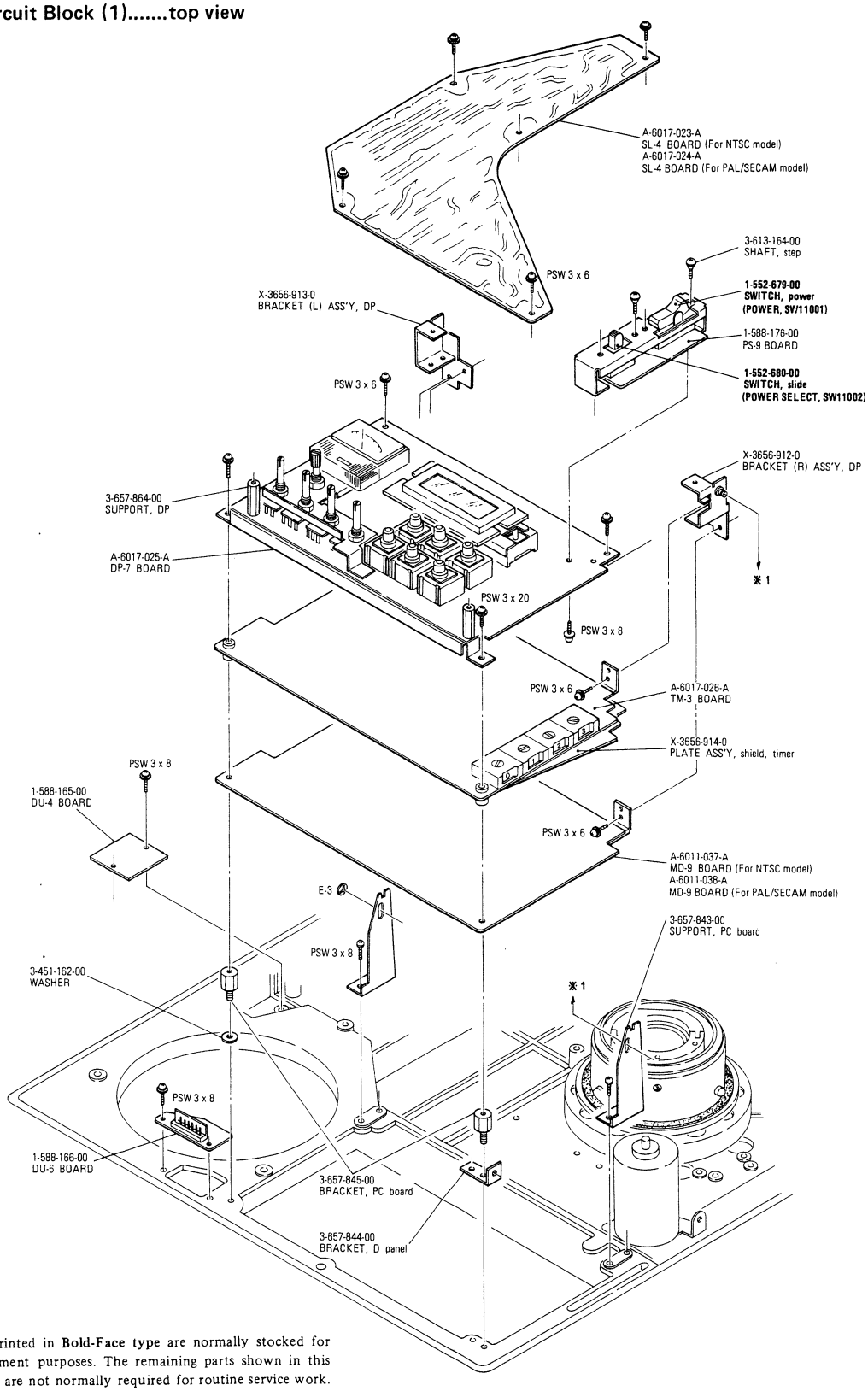
Printed Circuit Block (1).....top view



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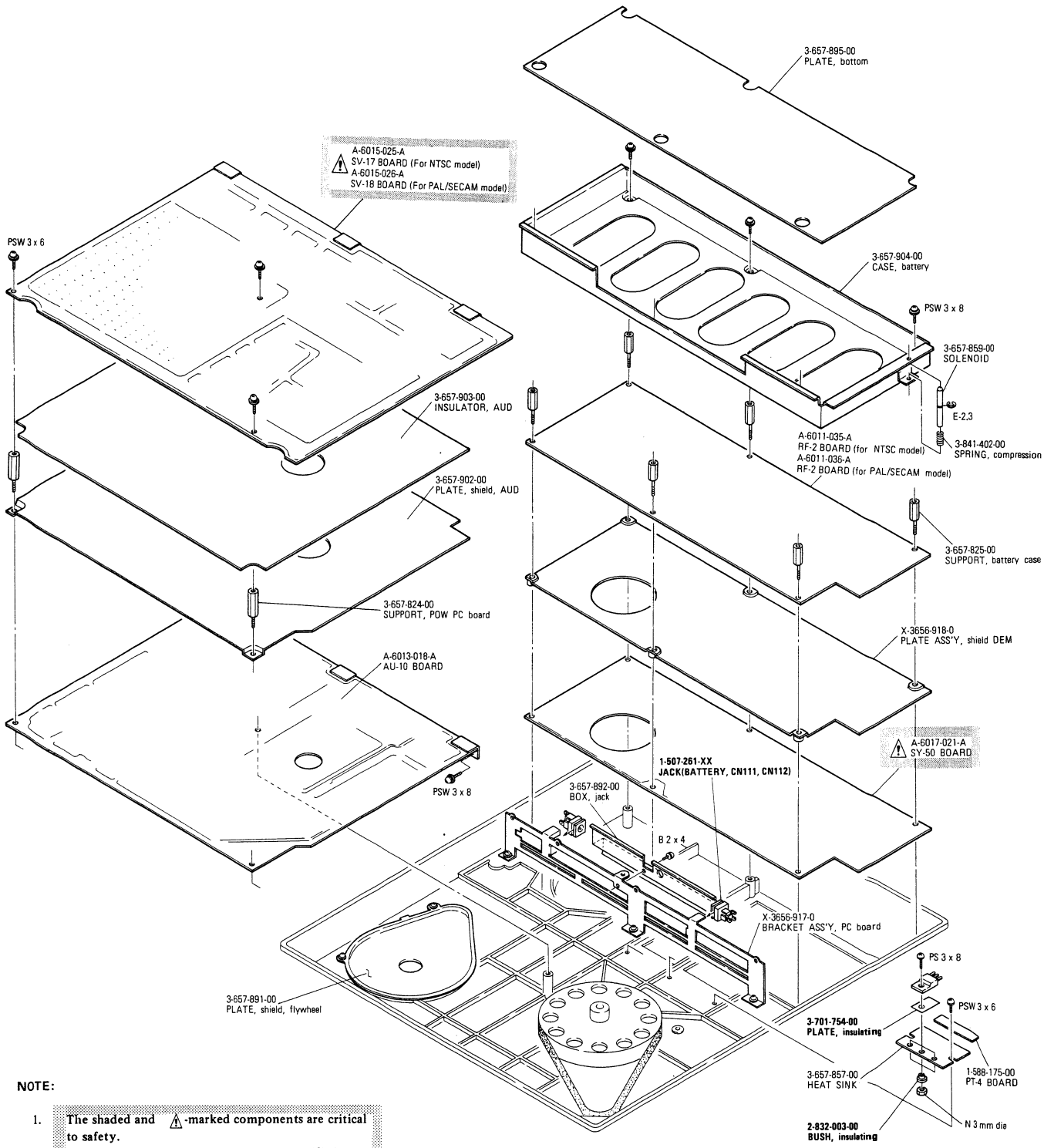
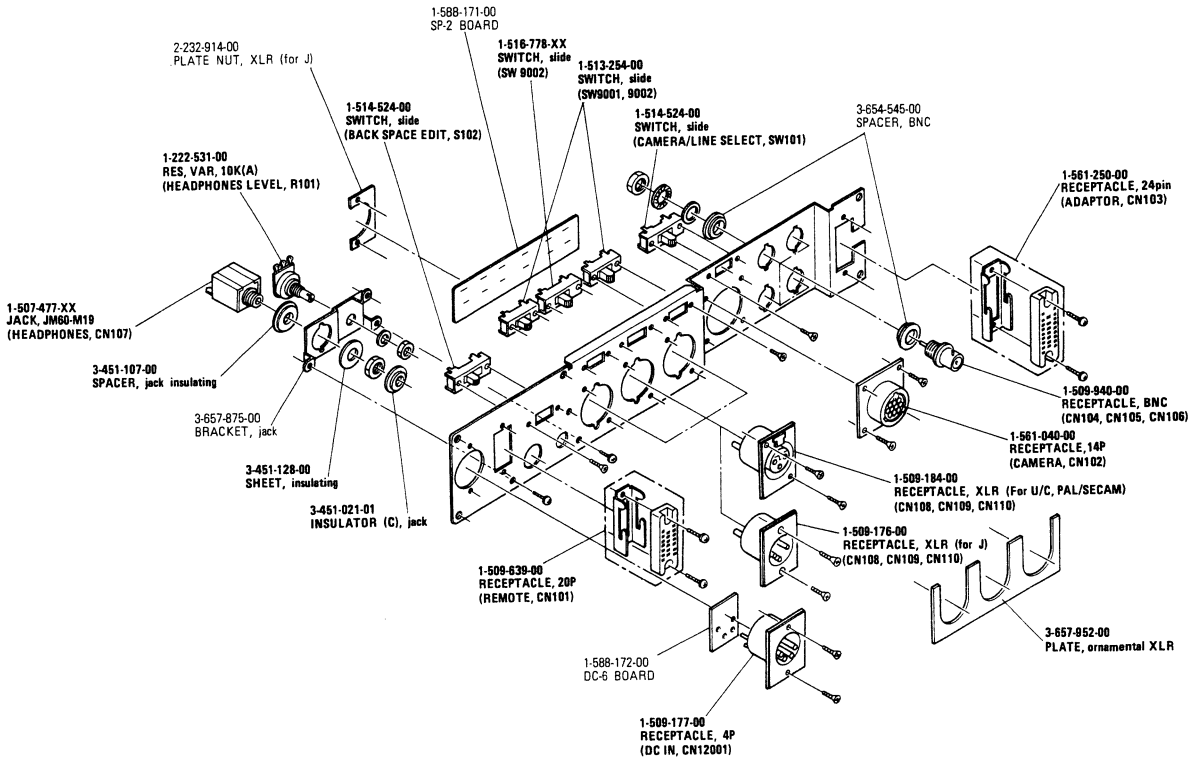
Printed Circuit Block (2),.....bottom view



NOTE:

1. **The shaded and ⚠-marked components are critical to safety.**
   Replace only with same component as specified.
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

Connector Panel Block



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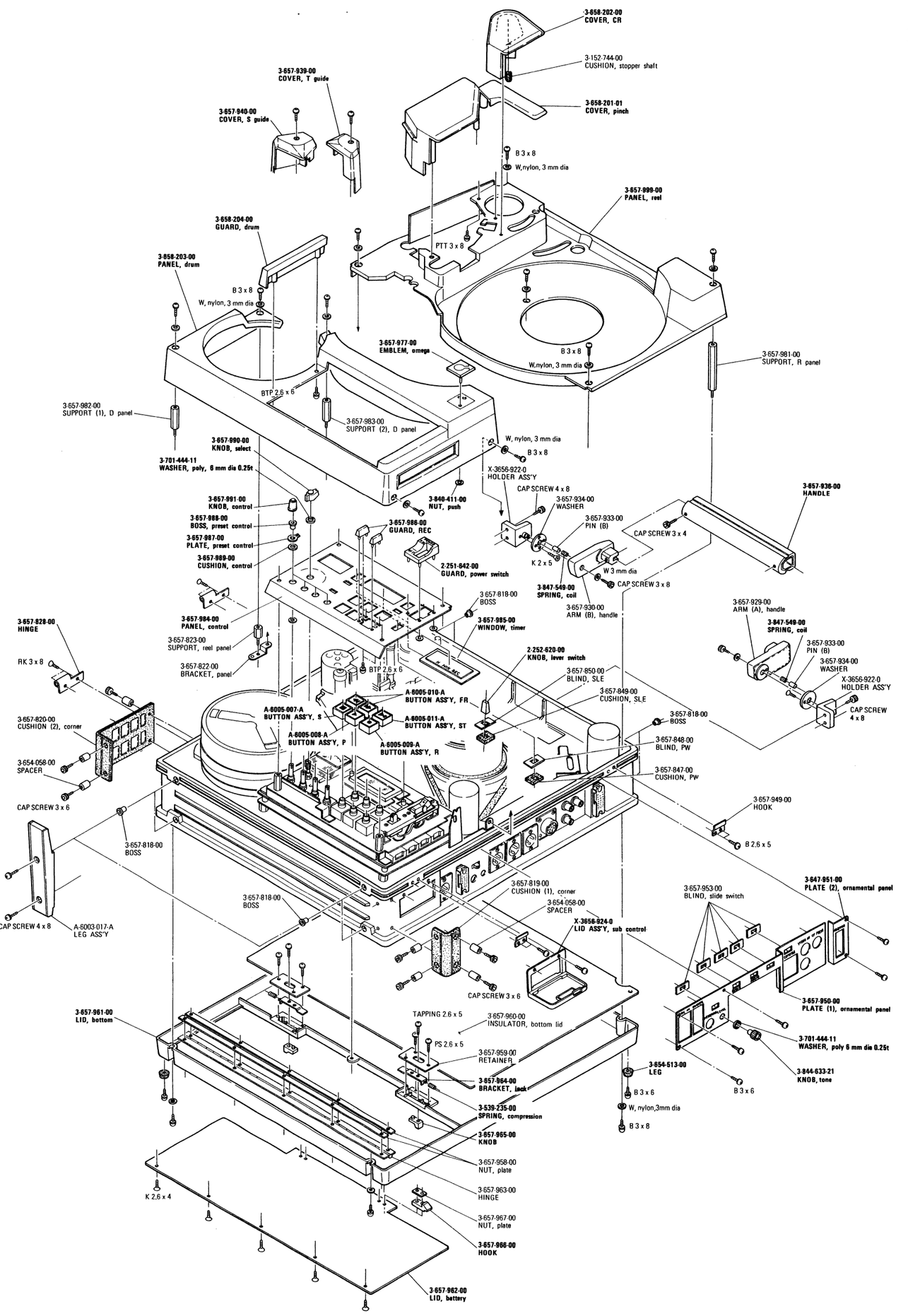

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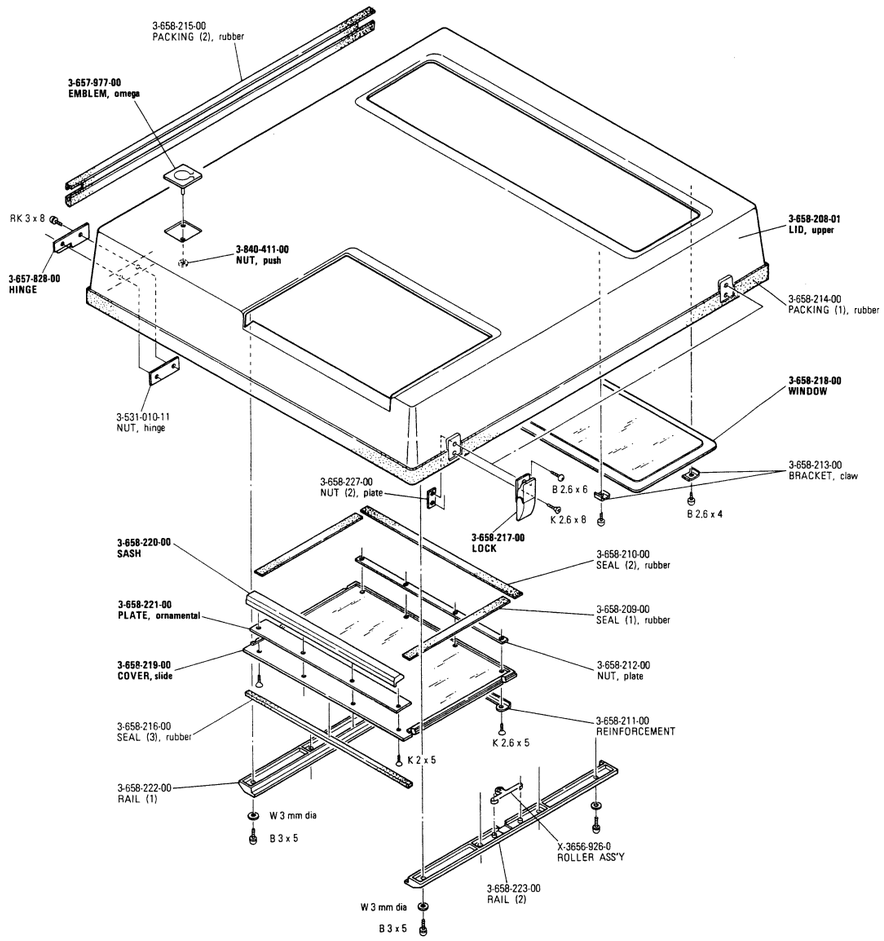
Cabinet Block (2).....upper lid



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16-3. ELECTRICAL PARTS LIST

Ref. No. Part No. Description

MOUNTED BOARD

A-6011-035-A	RF-2 board (NTSC)
A-6011-036-A	RF-2 board (PAL/SECAM)
A-6011-037-A	MD-9 board (NTSC)
A-6011-038-A	MD-9 board (PAL/SECAM)
A-6013-018-A	AU-10 board
⚠A-6015-025-A	SV-17 board (NTSC)
⚠A-6015-026-A	SV-18 board (PAL/SECAM)
⚠A-6017-021-A	SY-50 board (S/N 10301~10400)
⚠A-6017-021-B	SY-50 board (S/N 10401 and later)
A-6017-023-A	SL-4 board (NTSC)
A-6017-024-A	SL-4 board (PAL/SECAM)
A-6017-025-A	DP-7 board
A-6017-026-A	TM-3 board

PRINTED BOARD

1-588-162-00	CO-1 board
1-588-163-00	CO-2 board
1-588-164-00	CO-3 board
1-588-165-00	DU-4 board
1-588-166-00	DU-6 board
1-588-167-00	HD-1 board
1-588-168-00	HD-2 board
1-588-169-00	HD-3 board
1-588-170-00	CA-6 board
1-588-171-00	SP-2 board
1-588-172-00	DC-6 board
1-588-173-00	HM-3 board
1-588-174-00	FT-3 board
1-588-175-00	PT-4 board
1-588-176-00	PS-9 board
1-588-178-00	DU-5 board
1-588-844-00	RE-2 board

CAPACITOR

Parts that are not listed in the "reference numbers order list" are shown in following table.
Reference numbers are omitted.

MYLAR CAPACITOR **0.001μF through 0.22μF ±10% 50WV**

Parts No. 1-108-□□□-00

Value	Parts No. -□□□-
0.001μF	227
0.0012	351
0.0015	228
0.0018	352
0.0022	230
0.0027	353
0.0033	232
0.0039	354
0.0047	234
0.0056	355
0.0068	237
0.0082	356
0.01	239
0.012	357
0.015	240

Value	Parts No. -□□□-
0.018μF	358
0.022	242
0.027	359
0.033	244
0.039	360
0.047	246
0.056	361
0.068	249
0.082	362
0.1	251
0.12	363
0.15	252
0.18	364
0.22	254

NOTE:

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Replace only with same components as specified.

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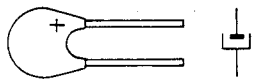
TANTALUM ELECTROLYTIC CAPACITOR



0.1μF through 100μF ±10%
3.15V through 35V

Parts No. 1-131-□□-00

Value		Parts No. – □□□ –
0.1μF	35V	209
0.15	35	210
0.22	35	211
0.33	35	212
0.47	35	213
0.68	35	214
1	25	236
	35	215
1.5	20	237
	25	
	35	216
2.2	20	217
	25	
	35	
3.3	16	218
	20	
	25	
	35	
4.7	10	232
	16	
	20	219
	25	
	35	
6.8	6.3	198
	10	
	16	

Value		Parts No. – □□□ –
6.8μF	20V	239
	25	
	35	
10	3.15	182
	6.3	199
	10	
	16	
	20	238
	25	
15	3.15	227
	6.3	189
	10	194
	16	200
	20	235
22	3.15	201
	6.3	
	10	
	16	
33	3.15	184
	6.3	195
	10	
47	3.15	191
	6.3	
68	3.15	186
100	3.15	187

Ref. No.	Part No.	Description			
AU-10 board					
C1101	1-109-549-00	mica	390pF	5%	100V
C1102	1-131-427-00	tantalum	220μF	20%	6.3V
C1104	1-107-067-00	mica	18pF	5%	50V
C1107	1-109-549-00	mica	390pF	5%	100V
C1108	1-123-332-00	elect	47μF		25V
C1111	1-107-076-00	mica	43pF	5%	50V
C1115	1-123-332-00	elect	47μF		25V
C1116	1-123-332-00	elect	47μF		25V
C1122	1-123-332-00	elect	47μF		25V
C1128	1-109-676-00	mica	130pF	5%	500V
C1132	1-102-106-00	ceramic	100pF		50V
C1133	1-107-061-00	mica	10pF	5%	50V
C1201	1-109-549-00	mica	390pF	5%	100V
C1202	1-131-427-00	tantalum	220μF	20%	6.3V
C1204	1-107-067-00	mica	18pF	5%	50V
C1207	1-109-549-00	mica	390pF	5%	100V
C1208	1-123-332-00	elect	47μF		25V
C1211	1-107-076-00	mica	43pF	5%	50V
C1215	1-123-332-00	elect	47μF		25V
C1216	1-123-332-00	elect	47μF		25V
C1222	1-123-332-00	elect	47μF		25V
C1228	1-109-676-00	mica	130pF	5%	500V
C1232	1-102-106-00	ceramic	100pF		50V
C1233	1-107-061-00	mica	10pF	5%	50V
C1302	1-131-427-00	tantalum	220μF	20%	6.3V
C1304	1-107-067-00	mica	18pF	5%	50V
C1307	1-109-549-00	mica	390pF	5%	100V
C1312	1-107-076-00	mica	43pF	5%	50V
C1317	1-123-332-00	elect	47μF		25V
C1318	1-123-332-00	elect	47μF		25V
C1324	1-123-332-00	elect	47μF		25V
C1331	1-109-676-00	mica	130pF	5%	500V
C1333	1-102-106-00	ceramic	100pF		50V
C1334	1-107-061-00	mica	10pF	5%	50V
C1401	1-123-333-00	elect	100μF		25V
C1402	1-123-332-00	elect	47μF		25V
C1404	1-123-333-00	elect	100μF		25V
C1405	1-123-333-00	elect	100μF		25V
C1406	1-123-333-00	elect	100μF		25V
C1407	1-123-333-00	elect	100μF		25V
C1410	1-141-010-XX	trimmer	200pF		

NOTE:

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   Replace only with same components as specified.

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Ref. No.	Part No.	Description			
C1411	1-141-010-XX	trimmer	200pF		
C1412	1-141-010-XX	trimmer	200pF		
C1413	1-109-677-00	mica	150pF	5%	500V
C1414	1-141-155-00	trimmer	600pF		
C1420	1-123-356-00	elect	10μF		50V
C1421	1-123-356-00	elect	10μF		50V
C1424	1-123-333-00	elect	100μF		25V
C1425	1-123-333-00	elect	100μF		25V
C1502	1-107-081-00	mica	68pF	5%	50V
C1503	1-109-540-00	mica	180pF	5%	100V
C1504	1-109-551-00	mica	440pF	5%	100V
C1507	1-109-549-00	mica	390pF	5%	100V
C1510	1-107-081-00	mica	68pF	5%	50V
C1513	1-109-540-00	mica	180pF	5%	100V
C1514	1-109-551-00	mica	440pF	5%	100V
C1516	1-109-549-00	mica	390pF	5%	100V
C1519	1-123-332-00	elect	47μF		25V
C1520	1-123-332-00	elect	47μF		25V
C1521	1-107-076-00	mica	43pF	5%	50V
C1522	1-107-076-00	mica	43pF	5%	50V

MD-9 board

C2001	1-123-356-00	elect	10μF		50V
C2002	1-123-307-00	elect	100μF		10V
C2003	1-123-332-00	elect	47μF		25V
C2004	1-101-005-00	ceramic	0.022μF		50V
C2005	1-123-356-00	elect	10μF		50V
C2006	1-141-131-00	trimmer	50pF		
C2007	1-123-356-00	elect	10μF		50V
C2008	1-123-306-00	elect	47μF		10V
C2009	1-107-084-00	mica	91pF	5%	50V
C2011	1-107-065-00	mica	15pF	5%	50V
C2013	1-109-739-00	mica	100pF	1%	100V
C2014	1-123-332-00	elect	47μF		25V
C2015	1-123-332-00	elect	47μF		25V
C2016	1-123-307-00	elect	100μF		10V
C2018	1-101-005-00	ceramic	0.022μF		50V
C2019	1-101-005-00	ceramic	0.022μF		50V
C2020	1-123-307-00	elect	100μF		10V
C2021	1-109-525-00	mica	39pF	5%	100V
C2022	1-109-525-00	mica	39pF	5%	100V
C2023	1-101-005-00	ceramic	0.022μF		50V
C2024	1-101-005-00	ceramic	0.022μF		50V
C2025	1-123-307-00	elect	100μF		10V
C2026	1-101-005-00	ceramic	0.022μF		50V
C2027	1-101-005-00	ceramic	0.022μF		50V
C2028	1-101-005-00	ceramic	0.022μF		50V
C2029	1-101-005-00	ceramic	0.022μF		50V
C2030	1-101-005-00	ceramic	0.022μF		50V
C2031	1-101-005-00	ceramic	0.022μF		50V
C2032	1-123-318-00	elect	33μF		16V
C2033	1-123-306-00	elect	47μF		10V
C2034	1-123-332-00	elect	47μF		25V
C2035	1-107-085-00	mica	100pF	5%	50V
C2036	1-101-005-00	ceramic	0.022μF		50V
C2037	1-107-079-00	mica	56pF	5%	50V
C2038	1-107-083-00	mica	82pF	5%	50V
C2039	1-107-079-00	mica	56pF	5%	50V
C2040	1-101-005-00	ceramic	0.022μF		50V
C2041	1-101-005-00	ceramic	0.022μF		50V
C2042	1-101-005-00	ceramic	0.022μF		50V
C2043	1-101-005-00	ceramic	0.022μF		50V
C2044	1-109-535-00	mica	100pF	5%	100V
C2045	1-109-535-00	mica	100pF	5%	100V
C2047	1-123-306-00	elect	47μF		10V
C2048	1-123-307-00	elect	100μF		10V
C2049	1-102-114-00	ceramic	470pF		50V
C2050	1-123-356-00	elect	10μF		50V
C2054	1-123-356-00	elect	10μF		50V
C2056	1-123-356-00	elect	10μF		50V
C2058	1-123-332-00	elect	47μF		25V
C2059	1-101-005-00	ceramic	0.022μF		50V
C2060	1-123-356-00	elect	10μF		50V
C2061	1-123-332-00	elect	47μF		25V
C2062	1-101-005-00	ceramic	0.022μF		50V
C2063	1-101-005-00	ceramic	0.022μF		50V
C2064	1-123-332-00	elect	47μF		25V
C2065	1-102-114-00	ceramic	470pF		50V
C2066	1-107-079-00	mica	56pF	5%	50V
C2067	1-109-538-00	mica	130pf	5%	100V

RF-2 board

C3001	1-101-005-00	ceramic	0.022μF		50V
C3002	1-101-005-00	ceramic	0.022μF		50V
C3003	1-123-332-00	elect	47μF		25V
C3004	1-101-005-00	ceramic	0.022μF		50V
C3005	1-101-005-00	ceramic	0.022μF		50V
C3006	1-123-332-00	elect	47μF		25V
C3007	1-107-061-00	mica	10pF	5%	50V

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Ref. No.	Part No.	Description			
C3008	1-107-085-00	mica	100pF	5%	50V
C3009	1-109-547-00	mica	330pF	5%	100V
C3010	1-107-085-00	mica	100pF	5%	50V
C3011	1-101-005-00	ceramic	0.022μF		50V
C3012	1-123-333-00	elect	100μF		25V
C3013	1-101-005-00	ceramic	0.022μF		50V
C3014	1-123-333-00	elect	100μF		25V
C3015	1-101-005-00	ceramic	0.022μF		50V
C3016	1-101-005-00	ceramic	0.022μF		50V
C3017	1-101-005-00	ceramic	0.022μF		50V
C3018	1-101-005-00	ceramic	0.022μF		50V
C3019	1-101-005-00	ceramic	0.022μF		50V
C3020	1-101-005-00	ceramic	0.022μF		50V
C3021	1-101-005-00	ceramic	0.022μF		50V
C3022	1-101-005-00	ceramic	0.022μF		50V
C3023	1-101-005-00	ceramic	0.022μF		50V
C3024	1-101-005-00	ceramic	0.022μF		50V
C3026	1-101-005-00	ceramic	0.022μF		50V
C3028	1-101-005-00	ceramic	0.022μF		50V
C3029	1-101-005-00	ceramic	0.022μF		50V
C3030	1-101-005-00	ceramic	0.022μF		50V
C3031	1-101-005-00	ceramic	0.022μF		50V
C3032	1-101-005-00	ceramic	0.022μF		50V
C3033	1-101-005-00	ceramic	0.022μF		50V
C3034	1-101-005-00	ceramic	0.022μF		50V
C3035	1-101-005-00	ceramic	0.022μF		50V
C3038	1-101-005-00	ceramic	0.022μF		50V
C3039	1-101-005-00	ceramic	0.022μF		50V
C3041	1-101-005-00	ceramic	0.022μF		50V
C3042	1-101-005-00	ceramic	0.022μF		50V
C3045	1-101-005-00	ceramic	0.022μF		50V
C3046	1-101-005-00	ceramic	0.022μF		50V
C3047	1-101-005-00	ceramic	0.022μF		50V
C3048	1-101-005-00	ceramic	0.022μF		50V
C3049	1-101-005-00	ceramic	0.022μF		50V
C3050	1-101-005-00	ceramic	0.022μF		50V
C3051	1-101-005-00	ceramic	0.022μF		50V
C3052	1-101-005-00	ceramic	0.022μF		50V
C3053	1-101-005-00	ceramic	0.022μF		50V
C3054	1-102-114-00	ceramic	470pF(B)		50V
C3055	1-101-005-00	ceramic	0.022μF		50V

Ref. No.	Part No.	Description			
C3056	1-107-078-00	mica	51pF	5%	50V
C3057	1-141-131-00	trimmer	50pF		
C3058	1-101-005-00	ceramic	0.022μF		50V
C3059	1-101-005-00	ceramic	0.022μF		50V
C3060	1-101-005-00	ceramic	0.022μF		50V
C3061	1-101-005-00	ceramic	0.022μF		50V
C3062	1-101-005-00	ceramic	0.022μF		50V
C3063	1-101-005-00	ceramic	0.022μF		50V
C3064	1-101-005-00	ceramic	0.022μF		50V
C3065	1-101-005-00	ceramic	0.022μF		50V
C3066	1-101-005-00	ceramic	0.022μF		50V
C3067	1-102-114-00	ceramic	470pF		50V
C3068	1-101-005-00	ceramic	0.022μF		50V
C3069	1-107-078-00	mica	51pF	5%	50V
C3070	1-141-131-00	trimmer	50pF		
C3071	1-107-083-00	mica	82pF	5%	50V
C3072	1-101-005-00	ceramic	0.022μF		50V
C3073	1-101-005-00	ceramic	0.022μF		50V
C3074	1-101-005-00	ceramic	0.022μF		50V
C3075	1-101-005-00	ceramic	0.022μF		50V
C3076	1-101-005-00	ceramic	0.022μF		50V
C3077	1-101-005-00	ceramic	0.022μF		50V
C3078	1-101-005-00	ceramic	0.022μF		50V
C3079	1-101-005-00	ceramic	0.022μF		50V
C3080	1-101-005-00	ceramic	0.022μF		50V
C3081	1-101-005-00	ceramic	0.022μF		50V
C3082	1-101-005-00	ceramic	0.022μF		50V
C3083	1-123-333-00	elect	100μF		25V
C3084	1-101-005-00	ceramic	0.022μF		50V
C3085	1-101-005-00	ceramic	0.022μF		50V
C3088	1-101-005-00	ceramic	0.022μF		50V
C3089	1-101-005-00	ceramic	0.022μF		50V
C3090	1-101-005-00	ceramic	0.022μF		50V
C3091	1-101-005-00	ceramic	0.022μF		50V
C3092	1-101-005-00	ceramic	0.022μF		50V
C3093	1-101-005-00	ceramic	0.022μF		50V
C3094	1-101-005-00	ceramic	0.022μF		50V
C3095	1-101-005-00	ceramic	0.022μF		50V
C3096	1-123-356-00	elect	10μF		50V
C3097	1-101-005-00	ceramic	0.022μF		50V
C3098	1-123-356-00	elect	10μF		50V
C3101	1-101-005-00	ceramic	0.022μF		50V
C3102	1-101-005-00	ceramic	0.022μF		50V
C3103	1-101-005-00	ceramic	0.022μF		50V
C3104	1-101-005-00	ceramic	0.022μF		50V

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Ref. No.	Part No.	Description			
C3105	1-101-005-00	ceramic	0.022μF		50V
C3107	1-101-005-00	ceramic	0.022μF		50V
C3108	1-109-527-00	mica	47pF	5%	100V
C3109	1-101-005-00	ceramic	0.022μF		50V
C3110	1-123-333-00	elect	100μF		25V
C3111	1-123-356-00	elect	10μF		50V
C3112	1-109-542-00	mica	220pF	2%	100V(PS)
C3112	1-107-083-00	mica	82pF	5%	50V(NTSC)
C3113	1-141-131-00	trimmer	50pF		
C3114	1-123-356-00	elect	10μF		50V
C3115	1-123-356-00	elect	10μF		50V
C3117	1-109-739-00	mica	100pF	1%	100V
C3118	1-107-083-00	mica	82pF	5%	50V
C3119	1-107-080-00	mica	62pF	5%	50V
C3120	1-123-307-00	elect	100μF		10V
C3121	1-123-333-00	elect	100μF		25V
C3122	1-123-333-00	elect	100μF		25V
C3123	1-123-311-00	elect	1000μF		10V
C3124	1-123-311-00	elect	1000μF		10V
C3125	1-123-356-00	elect	10μF		50V
C3126	1-107-073-00	mica	33pF	5%	50V
C3128	1-109-535-00	mica	100pF	5%	100V
C3129	1-109-535-00	mica	100pF	5%	100V
C3131	1-107-080-00	mica	62pF	5%	50V
C3132	1-107-080-00	mica	62pF	5%	50V
C3133	1-107-085-00	mica	100pF	5%	50V
C3134	1-107-085-00	mica	100pF	5%	50V
C3136	1-109-561-00	mica	0.001μF	5%	100V
C3137	1-109-557-00	mica	680pF	5%	100V
C3139	1-101-005-00	ceramic	0.022μF		50V
C3140	1-101-005-00	ceramic	0.022μF		50V
C3141	1-107-068-00	mica	20pF	5%	50V
C3142	1-101-005-00	ceramic	0.022μF		50V
C3143	1-101-005-00	ceramic	0.022μF		50V
C3144	1-107-076-00	mica	43pF	5%	50V (PS)
SV-17 board (NTSC ONLY)					
C4015	1-108-557-00	mylar	0.0012		50V
C4016	1-102-074-00	ceramic	0.001μF		50V
C4018	1-107-082-00	mica	75pF	5%	50V
C4019	1-107-085-00	mica	100pF	5%	50V
C4020	1-107-065-00	mica	15pF	5%	50V
C4034	1-107-065-00	mica	15pF	5%	50V
C4044	1-109-701-00	mica	0.0015μF	2%	500V
C4045	1-109-740-00	mica	3900pF	2%	500V
C4046	1-102-114-00	ceramic	470pF		50V
C4048	1-107-065-00	mica	15pF	5%	50V
C4063	1-123-334-00	elect	220μF		25V

Ref. No.	Part No.	Description			
C4070	1-123-322-00	elect	330μF		16V
C4076	1-123-322-00	elect	330μF		16V
C4103	1-131-480-00	tantalum	68μF	20%	20V
C4104	1-131-480-00	tantalum	68μF	20%	20V
C4105	1-131-480-00	tantalum	68μF	20%	20V
C4106	1-131-480-00	tantalum	68μF	20%	20V
C4107	1-131-480-00	tantalum	68μF	20%	20V
C4109	1-123-336-00	elect	470μF		25V
C4110	1-123-334-00	elect	220μF		25V
C4111	1-161-025-00	ceramic	0.1μF		25V
C4112	1-123-309-00	elect	330μF		10V
C4114	1-102-112-00	ceramic	330pF		50V
C4116	1-161-025-00	ceramic	0.1μF		25V
C4118	1-102-112-00	ceramic	330pF		50V
C4119	1-161-025-00	ceramic	0.1μF		25V
C4120	1-123-323-00	elect	470μF		16V
C4122	1-161-025-00	ceramic	0.1μF		25V
C4123	1-131-481-00	tantalum	47μF	20%	20V
C4124	1-131-481-00	tantalum	47μF	20%	20V
C4125	1-131-481-00	tantalum	47μF	20%	20V
C4126	1-131-481-00	tantalum	47μF	20%	20V
C4127	1-131-481-00	tantalum	47μF	20%	20V
C4128	1-131-481-00	tantalum	47μF	20%	20V
C4129	1-123-325-00	elect	2200μF		16V
C4167	1-101-005-00	ceramic	0.022μF		50V
C4168	1-101-005-00	ceramic	0.022μF		50V
C4169	1-101-005-00	ceramic	0.022μF		50V
C4170	1-101-005-00	ceramic	0.022μF		50V
C4171	1-101-005-00	ceramic	0.022μF		50V
C4172	1-101-005-00	ceramic	0.022μF		50V
C4173	1-101-005-00	ceramic	0.022μF		50V
C4174	1-101-005-00	ceramic	0.022μF		50V
C4175	1-101-005-00	ceramic	0.022μF		50V
C4176	1-101-005-00	ceramic	0.022μF		50V
C4177	1-101-005-00	ceramic	0.022μF		50V
C4178	1-101-005-00	ceramic	0.022μF		50V
C4179	1-101-005-00	ceramic	0.022μF		50V
C4180	1-101-005-00	ceramic	0.022μF		50V
C4181	1-101-005-00	ceramic	0.022μF		50V
C4182	1-101-005-00	ceramic	0.022μF		50V
C4183	1-101-005-00	ceramic	0.022μF		50V
C4206	1-141-155-00	trimmer	600pF		
C4207	1-109-695-00	mica	820pF	2%	500V
C4213	1-102-108-00	ceramic	150pF		50V
C4214	1-102-108-00	ceramic	150pF		50V
C4303	1-101-005-00	ceramic	0.022μF		50V
C4400	1-131-427-00	tantalum	220μF	20%	6.3V
C4401	1-131-427-00	tantalum	220μF	20%	6.3V

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SV-18 board (PAL/SECAM ONLY)					
C4015	1-108-557-00	mylar	0.0012		50V
C4016	1-102-074-00	ceramic	0.001μF		50V
C4018	1-107-082-00	mica	75pF	5%	50V
C4019	1-107-085-00	mica	100pF	5%	50V
C4020	1-107-065-00	mica	15pF	5%	50V
C4026	1-109-545-00	mica	270pF	5%	100V
C4034	1-107-065-00	mica	15pF	5%	50V
C4044	1-109-701-00	mica	0.0015μF	2%	500V
C4045	1-109-740-00	mica	3900pF	2%	500V
C4046	1-102-114-00	ceramic	470pF		50V
C4048	1-107-065-00	mica	15pF	5%	50V
C4063	1-123-334-00	elect	220μF		25V
C4070	1-123-322-00	elect	330μF		16V
C4076	1-123-322-00	elect	330μF		16V
C4103	1-131-480-00	tantalum	68μF	20%	20V
C4104	1-131-480-00	tantalum	68μF	20%	20V
C4105	1-131-480-00	tantalum	68μF	20%	20V
C4106	1-131-480-00	tantalum	68μF	20%	20V
C4107	1-131-480-00	tantalum	68μF	20%	20V
C4109	1-123-336-00	elect	470μF		25V
C4110	1-123-334-00	elect	220μF		25V
C4111	1-161-025-00	ceramic	0.1μF		25V
C4112	1-123-309-00	elect	330μF		10V
C4114	1-102-112-00	ceramic	330pF		50V
C4116	1-161-025-00	ceramic	0.1μF		25V
C4118	1-102-112-00	ceramic	330pF		50V
C4119	1-161-025-00	ceramic	0.1μF		25V
C4120	1-123-323-00	elect	470μF		16V
C4122	1-161-025-00	ceramic	0.1μF		25V
C4123	1-131-481-00	tantalum	47μF	20%	20V
C4124	1-131-481-00	tantalum	47μF	20%	20V
C4125	1-131-481-00	tantalum	47μF	20%	20V
C4126	1-131-481-00	tantalum	47μF	20%	20V
C4127	1-131-481-00	tantalum	47μF	20%	20V
C4128	1-131-481-00	tantalum	47μF	20%	20V
C4129	1-123-325-00	elect	2200μF		16V
C4167	1-101-005-00	ceramic	0.022μF		50V
C4168	1-101-005-00	ceramic	0.022μF		50V
C4169	1-101-005-00	ceramic	0.022μF		50V
C4170	1-101-005-00	ceramic	0.022μF		50V
C4171	1-101-005-00	ceramic	0.022μF		50V
C4172	1-101-005-00	ceramic	0.022μF		50V
C4173	1-101-005-00	ceramic	0.022μF		50V
C4174	1-101-005-00	ceramic	0.022μF		50V

Ref. No.	Part No.	Description			
C4175	1-101-005-00	ceramic	0.022μF		50V
C4176	1-101-005-00	ceramic	0.022μF		50V
C4177	1-101-005-00	ceramic	0.022μF		50V
C4178	1-101-005-00	ceramic	0.022μF		50V
C4179	1-101-005-00	ceramic	0.022μF		50V
C4180	1-101-005-00	ceramic	0.022μF		50V
C4181	1-101-005-00	ceramic	0.022μF		50V
C4182	1-101-005-00	ceramic	0.022μF		50V
C4183	1-101-005-00	ceramic	0.022μF		50V
C4206	1-141-155-00	trimmer	600pF		
C4207	1-109-693-00	mica	680pF	2%	500V
C4213	1-102-108-00	ceramic	150pF		50V
C4214	1-102-108-00	ceramic	150pF		50V
C4400	1-131-427-00	tantalum	220μF	20%	6.3V
C4401	1-131-427-00	tantalum	220μF	20%	6.3V
SY-50 board					
C5007	1-102-106-00	ceramic	100pF		50V
C5026	1-161-019-00	ceramic	0.033μF		25V
C5061	1-102-106-00	ceramic	100pF		50V
C5065	1-101-001-00	ceramic	0.001μF		25V
TM-3 board					
C6028	1-109-561-00	mica	0.001μF	5%	100V
DP-7 board					
C7005	1-131-240-00	tantalum	47μF	20%	16V
SL-4 board					
C8014	1-107-073-00	mica	33pF	5%	50V
C8019	1-102-110-00	ceramic	220pF		50V
C8022	1-107-085-00	mica	100pF	5%	50V
C8027	1-109-535-00	mica	100pF	5%	100V
C8031	1-107-073-00	mica	33pF	5%	50V
C8034	1-109-561-00	mica	0.001μF	5%	100V
C8035	1-109-561-00	mica	0.001μF	5%	100V
C8036	1-109-561-00	mica	0.001μF	5%	100V
C8037	1-109-545-00	mica	270pF	5%	100V
C8039	1-102-106-00	ceramic	100pF		50V

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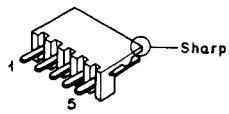
CONNECTOR

The plugs of the connectors that are shown in the following figures and are not listed in the "reference numbers order list".

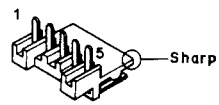
However the receptacles are listed.

top-type receptacle



2P	1-508-900-00
3P	1-508-901-00
4P	1-508-902-00
5P	1-508-903-00
6P	1-508-904-00
8P	1-508-905-00
10P	1-508-906-00
12P	1-508-949-00

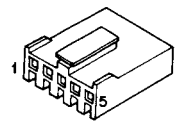
side-type receptacle



2P	1-508-933-00
3P	1-508-934-00
4P	1-508-950-00
5P	1-508-935-00
6P	1-508-936-00
8P	1-508-937-00
10P	1-508-951-00
12P	1-508-997-00

plug

housing



2P	1-509-983-00
3P	1-509-984-00
4P	1-509-985-00
5P	1-509-986-00
6P	1-509-987-00
8P	1-509-988-00
10P	1-509-989-00
12P	1-561-056-00

contact

1-509-982-00

Ref. No.	Part No.	Description
	1-931-948-00	flat cable with plugs 16P, CN7001 ⟷ CN101
	1-931-949-00	flat cable with plugs 16P, CN5031 ⟷ CN7002
	1-931-950-00	flat cable with plugs 16P, CN6011 ⟷ CN7003
	1-931-951-00	flat cable with plugs 16P, CN4064 ⟷ CN5033
	1-931-952-00	flat cable with plugs 16P, CN3044 ⟷ CN8053
	1-931-953-00	flat cable with plugs 14P, CN5032 ⟷ CN8054
	1-931-954-00	flat cable with plugs 14P, CN5034 ⟷ CN6012(8P), CN10092(6P)
	1-931-955-00	flat cable with plugs 16P, CN8055 ⟷ CN1072(6P), CN4062(5P), CN2022(5P)
	1-931-956-00	flat cable with plugs 20P, CN4068 ⟷ CN1071(4P), CN8052(4P), CN3042(4P), CN2023(4P), CN7005(4P)

Frame

CN101	**1-509-639-00**	**receptacle, 20P, female; REMOTE**
CN102	**1-561-040-00**	**receptacle, 14P, female; CAMERA**
CN103	**1-561-250-00**	**receptacle, 24P, female; ADAPTOR**
CN104	**1-509-940-00**	**receptacle BNC, female; VIDEO OUT**
CN105	**1-509-940-00**	**receptacle BNC, female; COLOR FRAME**
CN106	**1-509-940-00**	**receptacle BNC, female; VIDEO IN**
CN107	**1-507-355-XX**	**phone jack, JM60-M19; HEADPHONES**
CN108	**1-509-176-00**	**receptacle, XYR 3P male; AUDIO-3 IN (J)**
CN108	**1-509-184-00**	**receptacle, XLR 3P female; AUDIO-3 IN (U/C/AEP)**
CN109	**1-509-176-00**	**receptacle, XLR 3P male; AUDIO-2 IN (J)**
CN109	**1-509-184-00**	**receptacle, XLR 3P female; AUDIO-2 IN (U/C/AEP)**

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Ref. No.	Part No.	Description
CN110	**1-509-176-00**	**receptacle, XLR 3P male; AUDIO-1 IN (J)**
CN110	**1-509-184-00**	**receptacle, XLR 3P female; AUDIO-1 IN (U/C/AEP)**
CN111	**1-507-261-XX**	**jack, dc; BATTERY IN**
CN112	**1-507-261-XX**	**jack, dc; BATTERY IN**

AU-10 board

CN1071	1-508-902-00	receptacle	4P	male
CN1072	1-508-904-00	receptacle	6P	male
CN1073	1-508-903-00	receptacle	5P	male
CN1074	1-508-904-00	receptacle	6P	male
CN1075	1-508-905-00	receptacle	8P	male
CN1076	1-508-901-00	receptacle	3P	male
CN1077	1-508-901-00	receptacle	3P	male
CN1078	1-508-903-00	receptacle	5P	male
CN1079	1-508-904-00	receptacle	6P	male
CN1080	1-508-901-00	receptacle	3P	male
CN1081	1-508-906-00	receptacle	10P	male
CN1082	1-508-902-00	receptacle	4P	male
CN1083	1-508-904-00	receptacle	6P	male
CN1084	1-508-904-00	receptacle	6P	male

MD-9 board

CN2021	1-508-905-00	receptacle	8P	male
CN2022	1-508-903-00	receptacle	5P	male
CN2023	1-508-902-00	receptacle	4P	male
CN2024	1-508-902-00	receptacle	4P	male

RF-2 board

CN3041	1-508-906-00	receptacle	10P	male
CN3042	1-508-902-00	receptacle	4P	male
CN3043	1-508-949-00	receptacle	12P	male
CN3045	1-508-903-00	receptacle	5P	male

SV-17/SV-18 board

CN4061	1-508-906-00	receptacle	10P	male
CN4062	1-508-903-00	receptacle	5P	male
CN4063	1-508-905-00	receptacle	8P	male
CN4065	1-508-906-00	receptacle	10P	male
CN4066	1-508-905-00	receptacle	8P	male
CN4067	1-508-949-00	receptacle	12P	male
CN4068	1-561-271-00	receptacle	20P	male
CN4069	1-508-949-00	receptacle	12P	male
CN4165	1-508-906-00	receptacle	10P	male

SY-50 board

CN5035	1-508-935-00	receptacle	5P	male
CN5036	1-508-951-00	receptacle	10P	male

TM-3 board

CN6012	1-508-937-00	receptacle	8P	male
CN6013	1-508-934-00	receptacle	3P	male

DP-7 board

CN7004	1-508-901-00	receptacle	3P	male
CN7005	1-508-902-00	receptacle	4P	male
CN7006	1-508-906-00	receptacle	10P	male
CN7007	1-508-949-00	receptacle	12P	male
CN7010	1-560-130-00	receptacle	12P	male
CN7020	1-560-130-00	receptacle	12P	male
CN7030	1-560-130-00	receptacle	12P	male
CN7040	1-560-130-00	receptacle	12P	male
CN7510	1-560-131-00	receptacle	12P	female
CN7520	1-560-131-00	receptacle	12P	female
CN7530	1-560-131-00	receptacle	12P	female
CN7540	1-560-131-00	receptacle	12P	female

SL-4 board

CN8051	1-508-935-00	receptacle	5P	male
CN8052	1-508-950-00	receptacle	4P	male

CA-6 board

CN10091	1-508-935-00	receptacle	5P	male
CN10092	1-508-936-00	receptacle	6P	male
CN10093	1-508-935-00	receptacle	5P	male

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CN10094	1-508-937-00	receptacle	8P	male
CN10095	1-508-936-00	receptacle	6P	male

DC-6 board

CN12001	**1-509-177-00**	**receptacle, 4P male; EXT DC IN**

HD-1 board

CN14096	1-508-949-00	receptacle	12P	male

DIODE

AU-10 board

D1101	**8-719-200-02**	**10E-2**
D1102	**8-719-815-55**	**1S1555**
D1201	**8-719-200-02**	**10E-2**
D1202	**8-719-815-55**	**1S1555**
D1301	**8-719-200-02**	**10E-2**
D1302	**8-719-815-55**	**1S1555**
D1401	**8-719-931-15**	**EQB01-15**
D1402	**8-719-815-55**	**1S1555**
D1403	**8-719-815-55**	**1S1555**
D1404	**8-719-815-55**	**1S1555**
D1405	**8-719-815-55**	**1S1555**
D1406	**8-719-815-55**	**1S1555**
D1501	**8-719-815-80**	**1S1587**
D1502	**8-719-815-80**	**1S1587**
D1503	**8-719-151-07**	**RD5.1E**
D1504	**8-719-815-80**	**1S1587**
D1505	**8-719-815-80**	**1S1587**
D1506	**8-719-151-07**	**RD5.1E**

Ref. No.	Part No.	Description

MD-9 board

D2001	**8-719-815-55**	**1S1555**
D2002	**8-719-815-55**	**1S1555**
D2003	**8-719-815-55**	**1S1555**
D2004	**8-719-815-55**	**1S1555**
D2005	**8-719-815-55**	**1S1555**
D2006	**8-719-815-55**	**1S1555**
D2007	**8-719-162-07**	**RD6.2E**
D2008	**8-719-151-07**	**RD5.1E**
D2009	**8-719-815-55**	**1S1555**
D2010	**8-719-709-25**	**1S1925P**
D2011	**8-719-709-25**	**1S1925P**
D2012	**8-719-151-07**	**RD5.1E**
D2013	**8-719-815-55**	**1S1555**
D2014	**8-719-815-55**	**1S1555**
D2015	**8-719-162-07**	**RD6.2E**
D2016	**8-719-815-55**	**1S1555**
D2017	**8-719-815-55**	**1S1555**
D2018	**8-719-151-07**	**RD5.1E**
D2019	**8-719-931-15**	**EQB01-15**
D2020	**8-719-931-15**	**EQB01-15**

RF-2 board

D3001	**8-719-931-15**	**EQB01-15**
D3002	**8-719-815-55**	**1S1555**
D3003	**8-719-815-55**	**1S1555**
D3004	**8-719-815-55**	**1S1555**
D3005	**8-719-815-55**	**1S1555**
D3006	**8-719-815-55**	**1S1555**
D3007	**8-719-815-55**	**1S1555**
D3008	**8-719-815-55**	**1S1555**
D3009	**8-719-815-55**	**1S1555**
D3010	**8-719-200-02**	**10E-2**
D3011	**8-719-815-55**	**1S1555**
D3012	**8-719-815-55**	**1S1555**
D3013	**8-719-815-55**	**1S1555**
D3014	**8-719-815-55**	**1S1555**
D3015	**8-719-931-15**	**EQB01-15**
D3016	**8-719-815-55**	**1S1555**
D3017	**8-719-815-55**	**1S1555**
D3018	**8-719-815-55**	**1S1555**
D3019	**8-719-151-07**	**RD5.1E**
D3020	**8-719-815-55**	**1S1555**
D3021	**8-719-815-55**	**1S1555**
D3022 •	**8-719-190-07**	**RD9.1EB (Vz=8.49~8.98; Iz=5mA)**

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Ref. No.	Part No.	Description
SV-17/SV-18 board		
D4001	8-719-815-55	1S1555
D4002	8-719-815-55	1S1555
D4003	8-719-815-55	1S1555
D4004	8-719-815-55	1S1555
D4005	8-719-815-55	1S1555
D4007	8-719-815-55	1S1555
D4008	8-719-815-55	1S1555
D4009	8-719-815-55	1S1555
D4010	8-719-815-55	1S1555
D4011	8-719-815-55	1S1555
D4012	8-719-815-55	1S1555
D4013	8-719-815-55	1S1555
D4015	8-719-815-55	1S1555
D4016	8-719-162-07	RD6.2E
D4018	8-719-815-55	1S1555
D4019	8-719-815-55	1S1555
D4020	8-719-815-55	1S1555
D4025	8-719-815-55	1S1555
D4026	8-719-815-55	1S1555
D4027	8-719-200-02	10E-2
D4028	8-719-200-02	10E-2
D4029	8-719-815-55	1S1555
D4030	8-719-815-55	1S1555
D4031	8-719-191-07	RD9.1E
D4032	8-719-191-07	RD9.1E
D4033	8-719-931-15	EQB01-15
D4034	8-719-113-07	RD13E
D4035	8-719-191-07	RD9.1E
D4036	8-719-931-15	EQB01-15
D4037	8-719-931-24	EQB01-24
D4038	8-719-200-02	10E-2
D4039	8-719-162-07	RD6.2E
D4040	8-719-931-15	EQB01-15
D4102	8-719-151-07	RD5.1E
D4103	8-719-815-55	1S1555
D4104	8-719-815-55	1S1555
D4106	8-719-981-04	ERD81-004
D4107	8-719-162-07	RD6.2E
D4108	8-719-931-15	EQB01-15
D4109	8-719-818-35	1S1835
D4110	8-719-818-35	1S1835
D4200	8-719-815-55	1S1555
D4201	8-719-815-55	1S1555
D4202	8-719-815-55	1S1555

Ref. No.	Part No.	Description
D4300	8-719-815-55	1S1555 (SV-17 ONLY)
D4301	8-719-815-55	1S1555 (SV-17 ONLY)
D4302	8-719-815-55	1S1555 (SV-17 ONLY)
D4400	8-719-709-25	1S1925P
SY-50 board		
D5001	8-719-815-55	1S1555
D5002	8-719-815-55	1S1555
D5003	8-719-815-55	1S1555
D5004	8-719-156-07	RD5.6E
D5005	8-719-815-55	1S1555
D5006	8-719-815-55	1S1555
D5007	8-719-815-55	1S1555
D5008	8-719-815-55	1S1555
D5009	8-719-815-55	1S1555
D5010	8-719-815-55	1S1555
D5011	8-719-815-55	1S1555
D5012	8-719-815-55	1S1555
D5013	8-719-815-55	1S1555
D5014	8-719-815-55	1S1555
D5016	8-719-815-55	1S1555
D5017	8-719-815-55	1S1555
D5018	8-719-931-16	EQB01-16
D5019	8-719-931-16	EQB01-16
D5020	8-719-931-16	EQB01-16
D5021	8-719-931-16	EQB01-16
D5022	8-719-815-55	1S1555
D5023	8-719-815-55	1S1555(S/N 10301~10400)
D5024	8-719-815-55	1S1555(S/N 10301~10400)
D5025	8-719-815-55	1S1555(S/N 10301~10400)
D5026	8-719-815-55	1S1555
D5027	8-719-815-55	1S1555
D5028	8-719-815-55	1S1555(S/N 10301~10400)
D5029	8-719-815-55	1S1555
D5030	8-719-815-55	1S1555
D5031	8-719-815-55	1S1555(S/N 10301~10400)
D5032	8-719-815-55	1S1555(S/N 10301~10400)
D5033	8-719-815-55	1S1555(S/N 10301~10400)
D5034	8-719-815-55	1S1555
D5035	8-719-815-55	1S1555
D5036	8-719-815-55	1S1555
D5037	8-719-815-55	1S1555(S/N 10301~10400)
D5038	8-719-815-55	1S1555 (S/N 10401 and later)
D5039	8-719-815-55	1S1555 (S/N 10401 and later)

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Ref. No.	Part No.	Description
TM-3 board		
D6001	8-719-815-55	1S1555
D6002	8-719-815-55	1S1555
D6004	8-719-815-55	1S1555
D6005	8-719-815-55	1S1555
D6008	8-719-815-55	1S1555
DP-7 board		
D7001	8-719-946-70	HLMP-0301
D7002	8-719-946-70	HLMP-0301
D7003	8-719-946-70	HLMP-0301
D7004	8-719-162-07	RD6.2E
D7005	8-719-151-07	RD5.1E
SL-4 board		
D8001	8-719-815-55	1S1555
D8003	8-719-156-07	RD5.6E
D8004	8-719-815-55	1S1555
D8005	8-719-815-55	1S1555
D8006	8-719-815-55	1S1555
D8007	8-719-815-55	1S1555
CO-2 board		
D15004	8-719-411-02	ON1102
CO-1 board		
D16001	8-719-411-02	ON1102
D16002	8-719-411-02	ON1102
CO-3 board		
D17003	8-719-411-02	ON1102

Ref. No.	Part No.	Description
DELAY LINE		
RF-2 board		
DL3001	1-415-105-00	32ns
FUSE		
SV-17/SV-18 board		
⚠F4001	1-532-510-00	T8A
SY-50 board		
⚠F5001	1-532-237-00	T3.15A
FERRITE BEAD		
RF-2 board		
FB3001	1-535-178-00	ferrite bead
FB3002	1-535-178-00	ferrite bead
FB3003	1-535-178-00	ferrite bead
FB3004	1-535-178-00	ferrite bead
FB3005	1-535-178-00	ferrite bead
FB3006	1-535-178-00	ferrite bead
FB3007	1-535-178-00	ferrite bead
FB3008	1-535-178-00	ferrite bead
FB3009	1-535-178-00	ferrite bead

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Ref. No.	Part No.	Description
FB3010	1-535-178-00	ferrite beads
FB3011	1-535-178-00	ferrite beads
SV-17/SV-18 board		
FB4001	1-535-178-00	ferrite beads
FB4002	1-535-178-00	ferrite beads

HEAD

Frame

H101	8-829-157-10	AUDIO/CTL R/P; PP77-5104
H102	A-6036-013-A	AUDIO ERASE; EF18-5103 (NTSC)
H102	A-6036-014-A	AUDIO ERASE; EF18-5104 (PAL/SECAM)
H103	8-825-717-00	MONITOR HEAD; PF192-5102

IC

AU-10 board

IC1101	8-759-907-49	μA749PC;	FSC
IC1102	8-759-921-91	TL191CN;	TI
IC1103	8-759-145-57	μPC4557C;	NEC
IC1201	8-759-907-49	μA749PC;	FSC
IC1202	8-759-921-91	TL191CN;	TI
IC1203	8-759-145-57	μPC4557C;	NEC

Ref. No.	Part No.	Description
IC1301	8-759-907-49	μA749PC; FSC
IC1302	8-759-921-91	TL191CN; TI
IC1303	8-759-921-91	TL191CN; TI
IC1304	8-759-145-57	μPC4557C; NEC
IC1401	8-759-145-57	μPC4557C; NEC
IC1402	8-759-978-05	μA78L05AV; TI
IC1403	8-759-045-38	MC14538BCP, C-MOS; MOTOROLA
IC1404	8-759-145-57	μPC4557C; NEC
IC1405	8-759-240-93	TC4093BP, CMOS(CD4093BE:RCA)
IC1406	8-759-145-57	μPC4557C; NEC
IC1407	8-759-145-57	μPC4557C; NEC
IC1408	8-759-978-05	μA78L05AV; TI
IC1501	8-759-990-82	TL082CP; TI

MD-9 board

IC2001	8-759-001-16	MC10116L; MOTOROLA
IC2002	8-759-114-58	μPC1458C (μA1458TC: FSC)
IC2003	8-759-972-21	MM74C221N, C-MOS; NSC
IC2004	8-759-902-21	SN74LS221N, TTL; TI
IC2005	8-759-100-71	μPC71A (μA710; FSC)
IC2006	8-751-310-00	CX-131A; SONY
IC2007	8-759-114-58	μPC1458C (μA1458TC: FSC)

RF-2 board

IC3001	8-751-300-00	CX-130; SONY
IC3002	8-759-905-92	NE592K; SIGNETICS
IC3003	8-751-300-00	CX-130; SONY
IC3004	8-751-300-00	CX-130; SONY
IC3005	8-759-114-58	μPC1458C (μA1458TC: FSC)
IC3006	8-759-921-91	TL191CN; TI
IC3007	8-751-350-00	CX-135; SONY
IC3008	8-750-340-00	CX-034; SONY
IC3009	8-759-972-21	MM74C221N, C-MOS; NSC
IC3010	8-759-045-38	MC14538BCP, C-MOS; MOTOROLA
IC3011	8-759-178-05	μPC78L05; NEC

SV-17/SV-18 board

ICA2	8-759-902-90	SN74LS290N TTL; TI
ICA3	8-759-245-16	TC4516BP, C-MOS (MC14516BCP; MOTOROLA)

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Ref. No.	Part No.	Description
ICA4	8-759-041-75	MC14175BCP, C-MOS; MOTOROLA
ICA5	8-759-901-91	SN74LS191N, TTL; TI
ICA6	8-759-901-75	SN74LS175N, TTL; TI
ICA7	8-759-902-93	SN74LS293N, TTL; TI
ICA8	8-759-103-01	μPC301AC (μA301AT; FSC)
ICB2	8-759-245-16	TC4516BP, C-MOS (MC14516BCP; MOTOROLA)
ICB3	8-759-245-16	TC4516BP, C-MOS (MC14516BCP; MOTOROLA)
ICB4	8-759-041-75	MC14175BCP, C-MOS; MOTOROLA
ICB5	8-759-901-91	SN74LS191N, TTL; TI
ICB6	8-759-901-75	SN74LS175N, TTL; TI
ICB7	8-759-045-38	MC14538BCP, C-MOS; MOTOROLA
ICB8	8-759-103-01	μPC301AC (μA301AT; FSC)
ICC1	8-759-900-10	SN74LS10N, TTL; TI
ICC2	8-759-245-16	TC4516BP, C-MOS (MC14516BCP; MOTOROLA)
ICC3	8-759-140-49	μPD4049C, C-MOS (CD4049BE;RCA)
ICC4	8-759-900-74	SN74LS74N, TTL; TI
ICC5	8-759-900-20	SN74LS20N, TTL; TI
ICC6	8-759-140-20	μPD4001C, C-MOS (CD4001BE;RCA)
ICC7	8-759-980-02	DACIC8BC; DATEL
ICD1	8-759-245-16	TC4516BP, C-MOS (MC14516BCP; MOTOROLA)
ICD2	8-759-041-75	MC14175BCP, C-MOS; MOTOROLA
ICD3	8-759-901-91	SN74LS191N, TTL; TI
ICD4	8-759-901-75	SN74LS175N, TTL; TI
ICD5	8-759-240-13	TC4013BP, C-MOS (CD4013BE;RCA)
ICD6	8-759-618-41	M51841P (NE555N; SIGNETICS) (SV-17 ONLY)
ICD6	8-759-245-39	TC4539BP, C-MOS (MC14539BCP; MOTOROLA) (SV-18 ONLY)
ICD7	8-759-145-58	μPC4558C (RC4558C; RAYTHEON) (SV-17 ONLY)
ICD7	8-759-041-75	MC14175BCP, C-MOS, MOTOROLA (SV-18 ONLY)
ICD8	8-759-045-84	MC14584BCP, C-MOS; MOTOROLA
ICE1	8-759-245-16	TC4516BP, C-MOS (MC14516BCP; MOTOROLA)
ICE2	8-759-041-74	MC14174BCP, C-MOS; MOTOROLA
ICE3	8-759-901-91	SN74LS191N, TTL; TI
ICE4	8-759-901-75	SN74LS175N, TTL; TI
ICE5	8-759-980-02	DACIC8BC; DATEL
ICE6	8-759-145-58	μPC4558C (RC4558C; RAYTHEON)
ICE7	8-759-145-58	μPC4558C (RC4558C; RAYTHEON)
ICE8	8-759-103-01	μPC301AC (μA301AT; FSC)
ICF1	8-759-245-16	TC4516BP, C-MOS (MC14516BCP; MOTOROLA)
ICF2	8-759-900-74	SN74LS74N, TTL; TI
ICF3	8-759-240-11	TC4011BP, C-MOS (CD4011BE;RCA)
ICF4	8-759-045-38	MC14538BCP, C-MOS; MOTOROLA (SV-18 ONLY)
ICF4	8-759-240-13	TC4013BP, C-MOS(CD4013BE:RCA) (SV-17 ONLY)
ICF5	8-759-045-38	MC14538BCP, C-MOS; MOTOROLA
ICF8	8-759-145-58	μPC4558C (RC4558C; RAYTHEON) (SV-17 ONLY)
ICF8	8-759-990-82	TL082CP; TI (SV-18 ONLY)
ICG1	8-759-245-16	TC4516BP; C-MOS (MC14516BCP; MOTOROLA)
ICG2	8-759-140-49	μPD4049C, C-MOS (CD4049BE;RCA)
ICG3	8-759-240-13	TC4013BP, C-MOS (CD4013BE;RCA)
ICG4	8-759-045-38	MC14538BCP, C-MOS; MOTOROLA
ICG5	8-759-178-05	μPC78L05; NEC
ICH1	8-759-245-16	TC4516BP, C-MOS (MC14516BCP; MOTOROLA)
ICH2	8-759-970-90	MM74C90N, C-MOS; NSC
ICH3	8-759-245-20	TC4520BP, C-MOS (MC14520BCP; MOTOROLA)
ICH4	8-759-240-13	TC4013BP, C-MOS (CD4013BE;RCA)
ICH5	8-759-045-84	MC14584BCP, C-MOS; MOTOROLA
ICI1	8-759-045-38	MC14538BCP, C-MOS; MOTOROLA
ICI2	8-759-045-72	MC14572BCP, C-MOS; MOTOROLA
ICI3	8-759-240-68	TC4068BP, C-MOS (CD4068BE;RCA)
ICI4	8-759-045-38	MC14538BCP, C-MOS; MOTOROLA
ICI5	8-759-145-58	μPC4558C (RC4558C; RAYTHEON)
ICI6	8-759-145-58	μPC4558C (RC4558C; RAYTHEON)
ICI7	8-759-145-58	μPC4558C (RC4558C; RAYTHEON)
ICJ1	8-759-045-38	MC14538BCP, C-MOS; MOTOROLA (SV-18 ONLY)
ICJ2	8-759-240-13	TC4013BP, C-MOS (CD4013BE;RCA)
ICJ3	8-759-041-74	MC14174BCP, C-MOS; MOTOROLA
ICJ4	8-759-980-02	DACIC8BC; DATEL
ICP1	8-759-045-72	MC14572BCP, C-MOS; MOTOROLA
ICP2	8-759-145-58	μPC4558C (RC4558C; RAYTHEON)
ICP3	8-759-145-58	μPC4558C (RC4558C; RAYTHEON)
ICP4	8-759-904-97	TL497CN; TI
ICP5	8-759-903-57	LF357N; NSC
ICP6	8-759-904-97	TL497CN; TI
IC1	8-759-990-82	TL082CP; TI

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Ref. No.	Part No.	Description
SY-50 board (S/N 10301~10400) :JAPAN)		
ICA2	8-759-240-11	TC4011BP, C-MOS(CD4011BE;RCA)
ICA3	8-759-045-57	MC14557BCP, C-MOS; MOTOROLA
ICB2	8-759-240-11	TC4011BP, C-MOS(CD4011BE;RCA)
ICB3	8-759-045-57	MC14557BCP, C-MOS; MOTOROLA
ICC2	8-759-904-69	MSM4069, C-MOS (CD4069BE; RCA)
ICC3	8-759-240-11	TC4011BP, C-MOS(CD4011BE;RCA)
ICD1	8-759-240-23	TC4023BP, C-MOS(CD4023BE;RCA)
ICD2	8-759-240-13	TC4013BP, C-MOS(CD4013BE;RCA)
ICD3	8-759-240-30	TC4030BP,C-MOS (CD4030BE;RCA)
ICE1	8-759-045-84	MC14584BCP, C-MOS; MOTOROLA
ICE2	8-759-240-93	TC4093BP, C-MOS(CD4093BE;RCA)
ICE3	8-759-240-93	TC4093BP, C-MOS(CD4093BE;RCA)
ICF1	8-759-240-25	TC4025BP, C-MOS(CD4025BE;RCA)
ICF2	8-759-240-11	TC4011BP, C-MOS(CD4011BE;RCA)
ICG1	8-759-140-01	μPD4001C, C-MOS(CD4001BE;RCA)
ICG2	8-759-045-84	MC14584BCP, C-MOS; MOTOROLA
ICG3	8-759-045-38	MC14538BCP, C-MOS; MOTOROLA
ICH1	8-759-240-11	TC4011BP, C-MOS(CD4011BE;RCA)
ICH2	8-759-240-23	TC4023BP, C-MOS(CD4023BE;RCA)
ICH3	8-759-140-01	μPD4001C, C-MOS(CD4001BE;RCA)
ICI1	8-759-240-11	TC4011BP, C-MOS(CD4011BE;RCA)
ICI2	8-759-240-93	TC4093BP, C-MOS(CD4093BE;RCA)
ICI3	8-759-045-84	MC14584BCP, C-MOS; MOTOROLA
ICJ1	8-759-045-84	MC14584BCP, C-MOS; MOTOROLA
ICJ2	8-759-045-01	MC14501UBCP, C-MOS; MOTOROLA
ICJ3	8-759-240-11	TC4011BP, C-MOS(CD4011BE;RCA)
ICK1	8-759-240-23	TC4023BP, C-MOS(CD4023BE;RCA)
ICK2	8-759-240-11	TC4011BP, C-MOS(CD4011BE;RCA)
ICK3	8-759-045-84	MC14584BCP,C-MOS;MOTOROLA
ICL1	8-759-971-63	MM74C163N, C-MOS; NSC
ICL2	8-759-240-42	TC4042BP, C-MOS(CD4042BE;RCA)
ICL3	8-759-140-01	μPD4001C, C-MOS(CD4001BE;RCA)
ICM1	8-759-645-15	M54515P; MITSUBISHI
ICM2	8-759-245-55	TC4555BP, C-MOS (MC14555BCP; MOTOROLA)
ICM3	8-759-240-42	TC4042BP, C-MOS(CD4042BE;RCA)
ICN1	8-759-140-01	μPD4001C, C-MOS(CD4001BE;RCA)
ICN2	8-759-240-11	TC4011BP, C-MOS(CD4011BE;RCA)
ICN3	8-759-045-03	MC14503BCP, C-MOS; MOTOROLA
ICO1	8-759-045-84	MC14584BCP, C-MOS; MOTOROLA
ICO2	8-759-240-02	TC4002BP, C-MOS(CD4002BE;RCA)
ICO3	8-759-240-13	TC4013BP, C-MOS(CD4013BE;RCA)
ICP1	8-759-240-11	TC4011BP, C-MOS(CD4011BE;RCA)
ICP2	8-759-245-32	TC4532BP, C-MOS (MC14532BCP; MOTOROLA)
ICP3	8-759-904-69	MSM4069, C-MOS(CD4069BE;RCA)
ICQ1	8-759-240-13	TC4013BP, C-MOS(CD4013BE;RCA)
ICQ2	8-759-140-01	μPD4001C, C-MOS(CD4001BE;RCA)
IC1	8-759-178-05	μPC78L05; NEC
IC2	8-759-178-05	μPC78L05; NEC

Ref. No.	Part No.	Description
SY-50 board (S/N 10401 and later : All Destination)		
ICB0	8-759-045-84	MC14584BCP, C-MOS; MOTOROLA
ICC2	8-759-240-93	TC4093BP, C-MOS (CD4093BE; RCA)
ICC3	8-759-045-57	MC14557BCP, C-MOS; MOTOROLA
ICD2	8-759-240-93	TC4093BP, C-MOS (CD4093BE; RCA)
ICD3	8-759-045-57	MC14557BCP, C-MOS; MOTOROLA
ICE2	8-759-904-69	MSM4069, C-MOS (CD4069BE; RCA)
ICE3	8-759-240-11	TC4011BP, C-MOS (CD4011BE; RCA)
ICF1	8-759-240-93	TC4093BP, C-MOS (CD4093BE; RCA)
ICF2	8-759-240-13	TC4013BP, C-MOS (CD4013BE; RCA)
ICF3	8-759-240-30	TC4030BP, C-MOS (CD4030BE; RCA)
ICG1	8-759-240-11	TC4011BP, C-MOS (CD4011BE; RCA)
ICG2	8-759-240-93	TC4093BP, C-MOS (CD4093BE; RCA)
ICG3	8-759-240-11	TC4011BP, C-MOS (CD4011BE; RCA)
ICH1	8-759-240-25	TC4025BP, C-MOS (CD4025BE; RCA)
ICH2	8-759-240-23	TC4023BP, C-MOS (CD4023BE; RCA)
ICI1	8-759-045-84	MC14584BCP, C-MOS; MOTOROLA
ICI2	8-759-140-01	μPD4001C, C-MOS (CD4001BE; RCA)
ICI3	8-759-045-84	MC14584BCP, C-MOS; MOTOROLA
ICJ3	8-759-140-01	μPD4001C, C-MOS (CD4001BE; RCA)
ICK1	8-759-045-84	MC14584BCP, C-MOS; MOTOROLA
ICK2	8-759-240-23	TC4023BP, C-MOS (CD4023BE; RCA)
ICK3	8-759-045-38	MC14538BCP, C-MOS; MOTOROLA
ICL2	8-759-240-12	TC4012BP, C-MOS (CD4012BE; RCA)
ICL3	8-759-045-84	MC14584BCP, C-MOS; MOTOROLA
ICM1	8-759-971-63	MM74C163N, C-MOS; NSC
ICM2	8-759-240-11	TC4011BP, C-MOS (CD4011BE; RCA)
ICM3	8-759-240-93	TC4093BP, C-MOS (CD4093BE; RCA)
ICN1	8-759-240-23	TC4023BP, C-MOS (CD4023BE; RCA)
ICN2	8-759-240-42	TC4042BP, C-MOS (CD4042BE; RCA)
ICN3	8-759-140-01	μPD4001C, C-MOS (CD4001BE; RCA)
ICO1	8-759-645-15	M54515P; MITSUBISHI

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Ref. No.	Part No.	Description
ICO2	8-759-240-68	TC4068BP; C-MOS (CD4068BE; RCA)
ICO3	8-759-245-55	TC4555BP; C-MOS (MC14555BCP; MOTOROLA)
ICP1	8-759-140-01	μPD4001C; C-MOS (CD4001BE; MOTOROLA)
ICP2	8-759-240-93	TC4093BP; C-MOS (CD4093BE; RCA)
ICP3	8-759-240-42	TC4042BP; C-MOS (CD4042BE; RCA)
ICQ1	8-759-045-84	MC1458BCP; C-MOS; MOTOROLA
ICQ2	8-759-240-02	TC4002BP, C-MOS (CD4002BE; RCA)
ICQ3	8-759-240-13	TC4013BP, C-MOS (CD4013BE; RCA)
ICR1	8-759-240-11	TC4011BP, C-MOS (CD4011BE; RCA)
ICR2	8-759-245-32	TC4532BP, C-MOS (MC14532BCP; MOTOROLA)
ICR3	8-759-045-84	MC14584BCP, C-MOS; MOTOROLA
ICS1	8-759-240-13	TC4013BP, C-MOS (CD4001BE; RCA)
ICS3	8-759-140-01	μPD4001C, C-MOS (CD4001BE; RCA)
IC1	8-759-178-05	μPC78L05; NEC
IC2	8-759-178-05	μPC78L05; NEC

TM-3 board

ICA1	8-759-245-39	TC4539BP, C-MOS (MC14539BCP; MOTOROLA)
ICA2	8-759-245-39	TC4539BP, C-MOS (MC14539BCP; MOTOROLA)
ICB1	8-759-952-00	EECO5200; EECO
ICC2	8-759-045-72	MC14572BCP, C-MOS; MOTOROLA
ICC3	8-759-145-19	μPD4519C, C-MOS (MC14519BCP; MOTOROLA)
ICC4	8-759-040-70	MC14070BCP, C-MOS; MOTOROLA
ICD1	8-759-240-11	TC4011BP, C-MOS(CD4011BE;RCA)
ICD2	8-759-240-71	TC4071BP, C-MOS(CD4071BE;RCA)
ICD3	8-759-045-84	MC14584BCP, C-MOS; MOTOROLA
ICD4	8-759-240-11	TC4011BP, C-MOS (CD4011BE;RCA)
ICE2	8-759-240-13	TC4013BP, C-MOS(CD4013BE;RCA)
ICE4	8-759-040-46	MC14046BCP, C-MOS; MOTOROLA
ICF1	8-759-240-71	TC4071BP, C-MOS(CD4071BE;RCA)
ICF2	8-759-240-81	TC4081BP, C-MOS(CD4081BE;RCA)
ICF3	8-759-245-39	TC4539BP, C-MOS(MC14539BCP; MOTOROLA)
ICF4	8-759-245-39	TC4539BP, C-MOS (MC14539BCP; MOTOROLA)
ICG1	8-759-045-72	MC14572BCP, C-MOS; MOTOROLA
ICG2	8-759-245-10	TC4510BP, C-MOS (MC14510BCP; MOTOROLA)
ICG4	8-759-245-10	TC4510BP, C-MOS (MC14510BCP; MOTOROLA)
ICH2	8-759-240-27	TC4027BP, C-MOS(CD4027BE;RCA)
ICH4	8-759-245-10	TC4510BP, C-MOS (MC14510BCP; MOTOROLA)
ICI2	8-759-245-10	TC4510BP, C-MOS (MC14510BCP; MOTOROLA)
ICI3	8-759-245-10	TC4510BP, C-MOS (MC14510BCP; MOTOROLA)

DP-7 board

IC7001	8-759-245-43	TC4543BP, C-MOS (MC14543BCP; MOTOROLA)
IC7002	8-759-245-43	TC4543BP, C-MOS (MC14543BCP; MOTOROLA)
IC7003	8-759-245-43	TC4543BP, C-MOS (MC14543BCP; MOTOROLA)
IC7004	8-759-245-43	TC4543BP, C-MOS (MC14543BCP; MOTOROLA)
IC7005	8-759-245-43	TC4543BP, C-MOS (MC14543BCP; MOTOROLA)
IC7006	8-759-245-43	TC4543BP, C-MOS (MC14543BCP; MOTOROLA)
IC7007	8-759-040-77	MC14077BCP, C-MOS; MOTOROLA
IC7008	8-759-240-13	TC4013BP, C-MOS(CD4013BE;RCA)
IC7009	8-759-240-28	TC4028BP, C-MOS(CD4028BE;RCA)

SL-4 board

ICA2	8-759-240-13	TC4013BP, C-MOS(CD4013BE;RCA)
ICA3	8-759-240-15	TC4015BP, C-MOS(CD4015BE;RCA)
ICA4	8-759-240-15	TC4015BP, C-MOS(CD4015BE;RCA)
ICA5	8-759-145-19	μPD4519C, C-MOS (MC14519BCP; MOTOROLA)
ICA6	8-759-240-15	TC4015BP, C-MOS(CD4015BE;RCA)
ICA7	8-759-240-06	TC4006BP, C-MOS(CD4006BE;RCA)
ICA8	8-759-045-38	MC14538BCP, C-MOS; MOTOROLA
ICA9	8-759-045-38	MC14538BCP, C-MOS, MOTOROLA
ICA10	8-759-240-15	TC4015BP, C-MOS(CD4015BE;RCA)
ICA11	8-759-240-15	TC4015BP, C-MOS(CD4015BE;RCA)
ICA14	8-759-240-13	TC4013BP, C-MOS(CD4013BE;RCA)
ICB1	8-759-240-71	TC4071BP, C-MOS(CD4071BE;RCA)
ICB2	8-759-140-49	μPD4049C, C-MOS(CD4049BE;RCA)
ICB3	8-759-045-38	MC14538BCP, C-MOS; MOTOROLA
ICB4	8-759-145-19	μPD4519C, C-MOS (MC14519BCP; MOTOROLA)
ICB5	8-759-971-63	MM74C163N, C-MOS; NSC
ICB6	8-759-971-63	MM74C163N, C-MOS; NSC
ICB7	8-759-240-11	TC4011BP, C-MOS(CD4011BE;RCA)
ICB8	8-759-240-11	TC4011BP, C-MOS(CD4011BE;RCA)
ICB9	8-759-900-04	SN74LS04N, TTL; TI

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ICB10	8-759-901-63	SN74LS163N, TTL; TI
ICB11	8-759-901-63	SN74LS163N, TTL; TI
ICB12	8-759-902-21	SN74LS221N, TTL; TI
ICB13	8-759-900-02	SN74LS02N, TTL; TI
ICC1	8-759-240-11	TC4011BP, C-MOS(CD4011BE;RCA)
ICC2	8-759-140-49	μPD4049C, C-MOS(CD4049BE;RCA)
ICC3	8-759-908-20	TL820CN; TI
ICC4	8-759-045-38	MC14538BCP, C-MOS; MOTOROLA
ICC5	8-759-140-49	μPD4049C, C-MOS(CD4049BE;RCA)
ICC6	8-759-240-13	TC4013BP, C-MOS(CD4013BE;RCA)
IC101	8-759-978-05	μA78L05AV; TI
IC102	8-757-320-00	CX-732; SONY (NTSC ONLY)
IC102	8-757-330-00	CX-733; SONY (P/S ONLY)

INDUCTOR

AU-10 board

L1101	1-407-200-XX	micro	3.3mH
L1102	1-407-211-XX	micro	27mH
L1103	1-407-206-XX	micro	10mH
L1201	1-407-200-XX	micro	3.3mH
L1202	1-407-211-XX	micro	27mH
L1203	1-407-206-XX	micro	10mH
L1301	1-407-200-XX	micro	3.3mH
L1302	1-407-211-XX	micro	27mH
L1303	1-407-206-XX	micro	10mH
L1401	1-407-198-XX	micro	2.2mH
L1402	1-407-195-XX	micro	1mH
L1501	1-407-211-XX	micro	27mH
L1502	1-407-206-XX	micro	10mH
L1503	1-407-200-XX	micro	3.3mH
L1504	1-407-211-XX	micro	27mH
L1505	1-407-206-XX	micro	10mH
L1506	1-407-200-XX	micro	3.3mH
L1507	1-407-211-XX	micro	27mH
L1508	1-407-211-XX	micro	27mH

MD-9 board

L2001	1-407-569-00	VAR	10μH
L2002	1-407-161-XX	micro	22μH
L2003	1-407-569-00	VAR	10μH
L2004	1-407-165-XX	micro	47μH
L2005	1-407-165-XX	micro	47μH
L2006	1-407-159-XX	micro	15μH
L2007	1-407-168-XX	micro	82μH

Ref. No.	Part No.	Description	
RF-2 board			
L3001	1-407-565-00	VAR	2.2μH
L3002	1-407-564-00	VAR	1.5μH
L3003	1-407-177-XX	micro	470μH
L3004	1-407-177-XX	micro	470μH
L3005	1-407-564-00	VAR	1.5μH
SV-17/SV-18 board			
L4101	1-413-034-00	transformer, troidal	
L4102	1-409-309-00	troidal	
L4103	1-413-036-00	troidal	500μH
L4104	1-409-309-00	troidal	
L4105	1-413-036-00	troidal	500μH
L4106	1-409-309-00	troidal	
L4107	1-413-035-00	troidal	100μH
L4200	1-407-191-XX	micro	470μH
HD-1 board			
L14001	1-407-196-XX	micro	1.2mH
L14001	1-407-213-XX	micro	1.5mH

FILTER

MD-9 board

LPF2001	1-231-415-00	LPF

RF-2 board

LPF3001	1-231-413-00	LPF; 4.5MHz (NTSC ONLY)
LPF3001	1-231-414-00	LPF; 6.0MHz (PAL/SECAM ONLY)

MOTOR

M101	1-541-147-00	DC, 3557K020C; TAKE-UP REEL
M102	1-541-147-00	DC, 3557K020C; SUPPLY REEL
M103	1-541-146-00	DC, 3557K009C; CAPSTAN

METER

DP-7 board

ME7001	1-520-389-00	BATT/RF/VIDEO/AUDIO

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Ref. No.	Part No.	Description
SOLENOID		
PM101	1-454-199-00	PINCH
PM102	1-454-200-00	BRAKE
TRANSISTOR		
AU-10 board		
Q1101	8-729-113-04	2SK130A
Q1102	8-729-113-04	2SK130A
Q1103	8-765-600-00	2SC2593
Q1104	8-723-304-00	2SK43-4
Q1105	8-723-304-00	2SK43-4
Q1201	8-729-113-04	2SK130A
Q1202	8-729-113-04	2SK130A
Q1203	8-765-600-00	2SC2593
Q1204	8-723-304-00	2SK43-4
Q1205	8-723-304-00	2SK43-4
Q1301	8-729-113-04	2SK130A
Q1302	8-729-113-04	2SK130A
Q1303	8-765-600-00	2SC2593
Q1304	8-723-304-00	2SK43-4
Q1401	8-729-113-04	2SK130A
Q1402	8-729-113-04	2SK130A
Q1403	8-760-514-10	2SA772
Q1404	8-729-663-47	2SC1364
Q1405	8-729-612-77	2SA1027R
Q1406	8-760-335-10	2SC1474
Q1407	8-729-612-77	2SA1027R
Q1408	8-760-413-10	2SC1475
Q1409	8-760-413-10	2SC1475
Q1410	8-760-514-10	2SA772
Q1411	8-729-663-47	2SC1364
Q1412	8-729-612-77	2SA1027R
Q1413	8-729-663-47	2SC1364
Q1501	8-761-622-00	2SC1636
Q1502	8-723-302-00	2SK43-2
Q1503	8-761-622-00	2SC1636
Q1504	8-723-302-00	2SK43-2
MD-9 board		
Q2001	8-761-622-00	2SC1636
Q2002	8-724-375-01	2SC403C
Q2003	8-724-375-01	2SC403C
Q2004	8-724-375-01	2SC403C
Q2005	8-724-375-01	2SC403C
Q2006	8-722-383-40	2SK23A-834
Q2007	8-724-375-01	2SC403C
Q2008	8-722-383-40	2SK23A-834
Q2009	8-722-383-40	2SK23A-834
Q2010	8-724-375-01	2SC403C
Q2011	8-724-375-01	2SC403C
Q2012	8-724-375-01	2SC403C
Q2013	8-724-375-01	2SC403C
Q2014	8-722-383-40	2SK23A-834
Q2015	8-724-375-01	2SC403C
Q2016	8-724-375-01	2SC403C
Q2017	8-729-612-77	2SA1027R
Q2018	8-729-171-10	2SA711
Q2019	8-729-171-10	2SA711
Q2020	8-765-300-00	2SC2009
Q2021	8-765-300-00	2SC2009
Q2022	8-760-514-10	2SA772
Q2023	8-729-612-77	2SA1027R
Q2024	8-765-300-00	2SC2009
Q2025	8-765-300-00	2SC2009
Q2026	8-761-622-00	2SC1636
Q2027	8-760-514-10	2SA772
Q2028	8-724-375-01	2SC403C
Q2029	8-724-375-01	2SC403C
Q2030	8-760-413-10	2SC1475
Q2031	8-729-612-77	2SA1027R
Q2032	8-724-375-01	2SC403C
Q2033	8-760-413-10	2SC1475
Q2034	8-724-375-01	2SC403C
RF-2 board		
Q3001	8-729-612-77	2SA1027R
Q3002	8-724-375-01	2SC403C
Q3003	8-725-412-00	2SC1124
Q3004	8-725-412-00	2SC1124
Q3005	8-725-412-00	2SC1124
Q3006	8-724-375-01	2SC403C
Q3007	8-760-514-10	2SA772
Q3008	8-760-413-10	2SC1475
Q3009	8-729-612-77	2SA1027R
Q3010	8-724-375-01	2SC403C

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Ref. No.	Part No.	Description
Q3011	8-761-622-00	2SC1636
Q3012	8-724-375-01	2SC403C
Q3013	8-724-375-01	2SC403C
Q3014	8-729-612-77	2SA1027R
Q3015	8-724-375-01	2SC403C
Q3016	8-729-612-77	2SA1027R
Q3017	8-724-375-01	2SC403C
Q3018	8-725-412-00	2SC1124
Q3019	8-729-612-77	2SA1027R
Q3020	8-727-632-00	2SA706
Q3021	8-724-375-01	2SC403C
Q3022	8-725-412-00	2SC1124
Q3023	8-729-612-77	2SA1027R
Q3024	8-760-514-10	2SA772
Q3025	8-761-622-00	2SC1636
Q3026	8-724-375-01	2SC403C
Q3027	8-765-422-00	2SK152-2
Q3028	8-724-375-01	2SC403C
Q3028	8-724-375-01	2SC403C
Q3029	8-724-375-01	2SC403C
Q3030	8-724-375-01	2SC403C
Q3031	8-765-300-00	2SC2009
Q3032	8-765-300-00	2SC2009
Q3033	8-760-514-10	2SA772
Q3034	8-724-375-01	2SC403C
Q3035	8-724-375-01	2SC403C
Q3036	8-723-422-00	2SK152-2
Q3037	8-724-375-01	2SC403C
Q3038	8-724-375-01	2SC403C
Q3039	8-724-375-01	2SC403C
Q3040	8-765-300-00	2SC2009
Q3041	8-765-300-00	2SC2009
Q3042	8-761-622-00	2SC1636
Q3043	8-724-375-01	2SC403C
Q3044	8-724-375-01	2SC403C
Q3045	8-729-612-77	2SA1027R
Q3046	8-724-375-01	2SC403C
Q3047	8-724-375-01	2SC403C
Q3048	8-724-375-01	2SC403C
Q3049	8-724-375-01	2SC403C
Q3050	8-724-375-01	2SC403C
Q3051	8-724-375-01	2SC403C
Q3052	8-724-375-01	2SC403C
Q3053	8-724-375-01	2SC403C
Q3054	8-729-612-77	2SA1027R

Ref. No.	Part No.	Description
Q3055	8-724-375-01	2SC403C
Q3057	8-724-375-01	2SC403C
Q3058	8-724-375-01	2SC403C
Q3059	8-724-375-01	2SC403C
Q3060	8-724-375-01	2SC403C
Q3061	8-722-383-40	2SK23A-834
Q3062	8-761-622-00	2SC1636
Q3063	8-724-375-01	2SC403C
Q3064	8-760-413-10	2SC1475
Q3065	8-729-612-77	2SA1027R
Q3066	8-724-375-01	2SC403C
Q3067	8-760-514-10	2SA772
Q3068	8-724-375-01	2SC403C
Q3069	8-724-375-01	2SC403C
Q3070	8-724-375-01	2SC403C
Q3071	8-724-375-01	2SC403C
Q3072	8-724-375-01	2SC403C
Q3073	8-724-375-01	2SC403C
Q3074	8-761-622-00	2SC1636
Q3075	8-724-375-01	2SC403C
Q3076	8-724-375-01	2SC403C
Q3077	8-729-612-77	2SA1027R
Q3078	8-729-378-84	2SD788

SV-17/SV-18 board

Q4001	8-729-612-77	2SA1027R
Q4002	8-729-663-47	2SC1364
Q4003	8-729-612-77	2SA1027R
Q4004	8-729-663-47	2SC1364
Q4005	8-729-368-90	2SC689H
Q4006	8-761-622-00	2SC1636
Q4010	8-723-302-00	2SK43-2
Q4011	8-761-622-00	2SC1636
Q4012	8-761-622-00	2SC1636
Q4013	8-761-622-00	2SC1636
Q4014	8-761-622-00	2SC1636
Q4020	8-729-612-77	2SA1027R
Q4021	8-729-663-47	2SC1364
Q4022	8-723-302-00	2SK43-2
Q4023	8-761-622-00	2SC1636
Q4025	8-762-110-00	2SC1670-10
Q4026	8-729-663-47	2SC1364
Q4027	8-729-612-77	2SA1027R
Q4028	8-762-020-00	2SA835
Q4029	8-761-622-00	2SC1636

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Ref. No.	Part No.	Description
Q4030	8-729-663-47	2SC1364
Q4031	8-729-663-47	2SC1364
Q4032	8-729-663-47	2SC1364
Q4033	8-762-020-00	2SA835
Q4034	8-729-663-47	2SC1364
Q4035	8-761-622-00	2SC1636
Q4036	8-762-110-00	2SC1670-10
Q4037	8-729-663-47	2SC1364
Q4038	8-729-612-77	2SA1027R
Q4039	8-762-020-00	2SA835
Q4040	8-761-622-00	2SC1636
Q4041	8-761-622-00	2SC1636
Q4042	8-729-612-77	2SA1027R
Q4043	8-761-622-00	2SC1636
Q4044	8-729-612-77	2SA1027R
Q4045	8-760-335-10	2SC1474
Q4046	8-760-514-10	2SA772
Q4047	8-760-335-10	2SC1474
Q4048	8-729-612-77	2SA1027R
Q4101	8-760-413-10	2SC1475
Q4102	8-760-413-10	2SC1475
Q4103	8-729-303-52	2SD735-B02
Q4104	8-729-612-77	2SA1027R
Q4105	8-760-514-10	2SA772
Q4106	8-760-514-10	2SA772
Q4107	8-729-247-33	2SA473
Q4108	8-729-612-77	2SA1027R
Q4109	8-761-622-00	2SC1636
Q4200	8-760-514-10	2SA772
Q4201	8-761-622-00	2SC1636
Q4202	8-723-302-00	2SK43-2(NTSC/PM)
Q4202	8-723-304-00	2SK43-4(PS)
Q4203	8-760-413-10	2SC1475
Q4204	8-760-413-10	2SC1475
Q4300	8-729-612-77	2SA1027R (SV-17 ONLY)
Q4400	8-723-304-00	2SK43-4
Q4401	8-723-304-00	2SK43-4

SY-50 board

Q5001	8-724-375-01	2SC403C
Q5002	8-724-375-01	2SC403C
Q5003	8-724-375-01	2SC403C
Q5004	8-724-375-01	2SC403C
Q5005	8-729-612-77	2SA1027R
Q5007	8-724-375-01	2SC403C
Q5008	8-760-523-10	2SA772
Q5009	8-760-523-10	2SA772
Q5010	8-765-222-20	2SC1963
Q5011	8-765-222-20	2SC1963
Q5014	8-760-335-10	2SC1474
Q5015	8-760-335-10	2SC1474
Q5016	8-760-523-10	2SA772
Q5017	8-760-523-10	2SA772
Q5018	8-765-222-20	2SC1963
Q5019	8-765-222-20	2SC1963
Q5022	8-760-335-10	2SC1474
Q5023	8-760-335-10	2SC1474

DP-7 board

Q7001	8-724-375-01	2SC403C

SL-4 board

Q8001	8-729-612-77	2SA1027R
Q8002	8-724-375-01	2SC403C
Q8003	8-724-375-01	2SC403C
Q8004	8-724-375-01	2SC403C
Q8005	8-724-375-01	2SC403C
Q8006	8-724-375-01	2SC403C
Q8007	8-724-375-01	2SC403C
Q8008	8-724-375-01	2SC403C

PT-4A board

Q13001	8-729-306-62	2SB566
Q13002	8-729-307-62	2SD476
Q13003	8-729-307-62	2SD476

PT-4B board

Q13501	8-729-306-62	2SB566
Q13502	8-729-307-62	2SD476
Q13503	8-729-307-62	2SD476

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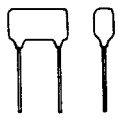
RESISTOR

Parts that are not listed in the "reference numbers order list" are shown in following table.
Reference numbers are omitted.

METAL FILM RESISTOR ± 1%, 1/4W
10Ω through 100kΩ



Parts No. 1-214-□□-00

Value	Parts No. −□□□−
10Ω	084
11	085
12	086
13	087
15	088
16	089
18	090
20	091
22	092
24	093
27	094
30	095
33	096
36	097
39	098
43	099
47	100
51	101
56	102
62	103
68	104
75	105
82	106
91	107

Value	Parts No. −□□□−
100Ω	108
110	109
120	110
130	111
150	112
160	113
180	114
200	115
220	116
240	117
270	118
300	119
330	120
360	121
390	122
430	123
470	124
510	125
560	126
620	127
680	128
750	129
820	130
910	131

Value	Parts No. −□□□−
1.0kΩ	132
1.1	133
1.2	134
1.3	135
1.5	136
1.6	137
1.8	138
2.0	139
2.2	140
2.4	141
2.7	142
3.0	143
3.3	144
3.6	145
3.9	146
4.3	147
4.7	148
5.1	149
5.6	150
6.2	151
6.8	152
7.5	153
8.2	154
9.1	155

Value	Parts No. −□□□−
10kΩ	156
11	157
12	158
13	159
15	160
16	161
18	162
20	163
22	164
24	165
27	166
30	167
33	168
36	169
39	170
43	171
47	172
51	173
56	174
62	175
68	176
75	177
82	178
91	179
100	180

Ref. No.	Part No.	Description			
AU-10 board					
R1108	1-224-936-00	VAR, metal	500		
R1113	1-224-939-00	VAR, metal	5K		
R1133	1-224-939-00	VAR, metal	5K		
R1134	1-224-937-00	VAR, metal	1K		
R1208	1-224-936-00	VAR, metal	500		
R1213	1-224-939-00	VAR, metal	5K		
R1233	1-224-939-00	VAR, metal	5K		
R1234	1-224-937-00	VAR, metal	1K		
R1309	1-224-936-00	VAR, metal	500		
R1314	1-224-939-00	VAR, metal	5K		
R1317	1-246-527-00	carbon,	180K	5%	¼W
R1332	1-224-941-00	VAR, metal	20K		
R1338	1-224-939-00	VAR, metal	5K		
R1339	1-224-937-00	VAR, metal	1K		
R1347	1-224-943-00	VAR, metal	100K		
R1436	1-224-941-00	VAR, metal	20K		
R1449	1-224-943-00	VAR, metal	100K		
R1501	1-246-537-00	carbon	470K	5%	¼W
R1505	1-224-937-00	VAR, metal	1K		
R1511	1-246-545-00	carbon	1M	5%	¼W
R1512	1-246-537-00	carbon	470K	5%	¼W
R1516	1-224-937-00	VAR, metal	1K		
R1522	1-246-545-00	carbon	1M	5%	¼W
MD-9 board					
R2010	1-224-938-00	VAR, metal	2K		
R2021	1-224-936-00	VAR, metal	500		
R2030	1-224-938-00	VAR, metal	2K		
R2042	1-224-938-00	VAR, metal	2K		
R2046	1-224-942-00	VAR, metal	50K		
R2056	1-224-936-00	VAR, metal	500		
R2079	1-224-936-00	VAR, metal	500		
R2086	1-224-938-00	VAR, metal	2K		
R2088	1-246-545-00	carbon	1M	5%	¼W
R2089	1-246-545-00	carbon	1M	5%	¼W
R2095	1-224-940-00	VAR, metal	10K		
R2098	1-224-937-00	VAR, metal	1K		
R2111	1-224-938-00	VAR, metal	2K		
R2115	1-224-938-00	VAR, metal	2K		
R2123	1-224-938-00	VAR, metal	2K		

Ref. No.	Part No.	Description			
RF-2 board					
R3008	1-224-938-00	VAR, metal	2K		
R3020	1-224-924-00	VAR, metal	100		
R3053	1-224-934-00	VAR, metal	100		
R3062	1-224-934-00	VAR, metal	100		
R3073	1-224-937-00	VAR, metal	1K		
R3087	1-224-934-00	VAR, metal	100		
R3099	1-224-937-00	VAR, metal	1K		
R3113	1-224-934-00	VAR, metal	100		
R3130	1-224-934-00	VAR, metal	100		
R3132	1-224-928-00	VAR, metal	2K		
R3165	1-224-939-00	VAR, metal	5K		
R3176	1-224-934-00	VAR, metal	100		
R3185	1-224-936-00	VAR, metal	500		
R3198	1-224-937-00	VAR, metal	1K		
R3220	1-246-543-00	carbon	820K	5%	¼W
R2227	1-246-545-00	carbon	1M	5%	¼W
R2231	1-224-940-00	VAR, metal	10K		
R2234	1-224-940-00	VAR, metal	10K		
R2246	1-224-940-00	VAR, metal	10K		
SV-17 board (NTSC ONLY)					
R4023	1-224-942-00	VAR, metal	50K		
R4024	1-224-942-00	VAR, metal	50K		
R4040	1-224-936-00	VAR, metal	500		
R4051	1-246-537-00	carbon	470K	5%	¼W
R4062	1-246-537-00	carbon	470K	5%	¼W
R4063	1-224-938-00	VAR, metal	2K		
R4075	1-246-537-00	carbon	470K	5%	¼W
R4078	1-246-537-00	carbon	470K	5%	¼W
R4081	1-224-942-00	VAR, metal	50K		
R4089	1-224-923-00	VAR, metal	100K		
R4091	1-224-941-00	VAR, metal	20K		
R4097	1-224-937-00	VAR, metal	1K		
R4119	1-224-939-00	VAR, metal	5K		
⚠R4122	1-212-364-00	metal	2.2	5%	1W
⚠R4123	1-217-579-00	metal	0.27	10%	2W

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   Replace only with same components as specified.

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Ref. No.	Part No.	Description			
⚠R4124	1-217-579-00	metal	0.27	10%	2W
⚠R4128	1-217-154-00	metal	0.68	10%	2W
⚠R4138	1-217-154-00	metal	0.68	10%	2W
⚠R4139	1-217-153-00	wirewound	0.47	10%	2W
⚠R4140	1-217-153-00	wirewound	0.47	10%	2W
⚠R4141	1-212-364-00	metal	2.2	5%	1W
R4166	1-224-940-00	VAR, metal	10K		
R4169	1-224-939-00	VAR, metal	5K		
⚠R4183	1-217-153-00	wirewound	0.47	10%	2W
⚠R4189	1-207-615-00	metal	0.33	10%	2W
R4205	1-224-935-00	VAR, metal	200		
R4209	1-246-401-00	carbon	1	5%	¼W
R4403	1-246-545-00	carbon	1M	5%	¼W
R4405	1-246-545-00	carbon	1M	5%	¼W

SV-18 board (PAL/SECAM ONLY)

R4003	1-246-545-00	carbon	1M	5%	¼W
R4023	1-224-942-00	VAR, metal	50K		
R4024	1-224-943-00	VAR, metal	100K		
R4040	1-224-936-00	VAR, metal	500		
R4051	1-246-537-00	carbon	470K	5%	¼W
R4062	1-246-537-00	carbon	470K	5%	¼W
R4063	1-224-938-00	VAR, metal	2K		
R4075	1-246-537-00	carbon	470K	5%	¼W
R4078	1-246-537-00	carbon	470K	5%	¼W
R4081	1-224-942-00	VAR, metal	50K		
R4089	1-224-923-00	VAR, metal	100K		
R4091	1-224-941-00	VAR, metal	20K		
R4097	1-224-937-00	VAR, metal	1K		
R4119	1-224-939-00	VAR, metal	5K		
⚠R4122	1-212-364-00	metal	2.2	5%	1W

Ref. No.	Part No.	Description			
⚠R4123	1-217-579-00	metal	0.27	10%	2W
⚠R4124	1-217-579-00	metal	0.27	10%	2W
⚠R4128	1-217-154-00	metal	0.68	10%	2W
⚠R4139	1-217-153-00	wirewound	0.47	10%	2W
⚠R4140	1-217-153-00	wirewound	0.47	10%	2W
⚠R4141	1-212-364-00	metal	2.2	5%	1W
R4166	1-224-940-00	VAR, metal	10K		
R4169	1-224-939-00	VAR, metal	5K		
⚠R4189	1-207-615-00	metal	0.33	10%	2W
R4205	1-224-935-00	VAR, metal	200		
R4209	1-246-401-00	carbon	1	5%	¼W
R4403	1-246-545-00	carbon	1M	5%	¼W
R4405	1-246-545-00	carbon	1M	5%	¼W

SY-50 board

R5009	1-246-530-00	carbon	240K	5%	¼W
R5023	1-246-545-00	carbon	1M	5%	¼W
R5024	1-246-545-00	carbon	1M	5%	¼W
R5031	1-246-545-00	carbon	1M	5%	¼W
R5035	1-246-540-00	carbon	620K	5%	¼W
R5037	1-246-532-00	carbon	300K	5%	¼W
R5038	1-246-525-00	carbon	150K	5%	¼W
R5040	1-246-545-00	carbon	1M	5%	¼W
R5050	1-246-528-00	carbon	200K	5%	¼W
R5059	1-246-529-00	carbon	220K	5%	¼W
R5063	1-246-545-00	carbon	1M	5%	¼W
R5064	1-246-538-00	carbon	510K	5%	¼W
R5066	1-246-528-00	carbon	200K	5%	¼W

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Ref. No.	Part No.	Description			
R5112	1-246-545-00	carbon	1M	5%	¼W
R5113	1-246-545-00	carbon	1M	5%	¼W

TM-3 board

R6012	1-246-524-00	carbon	130K	5%	¼W
R6022	1-246-521-46	carbon	100K	5%	¼W
RB6001	1-231-411-00	resistor block	100K		

DP-7 board

R7005	1-226-404-00	VAR, carbon	10K(A)
R7006	1-226-404-00	VAR, carbon	10K(A)
R7007	1-226-404-00	VAR, carbon	10K(A)
R7008	1-226-403-00	VAR, carbon	1K(B)
R7015	1-224-941-00	VAR, metal	20K

SL-4 board

R8011	1-246-537-00	carbon	470K	5%	¼W
R8077	1-224-939-00	VAR, metal	5K		

SP-2 board

R9003	1-246-429-00	carbon	15	5%	¼W
R9006	1-246-429-00	carbon	15	5%	¼W
R9009	1-246-429-00	carbon	15	5%	¼W

Frame

R101	1-224-692-00	VAR, carbon	10K(A); HEADPHONES LEVEL

RELAY

AU-10 board

RL1101	1-515-309-00	relay	5V	25mA
RL1201	1-515-309-00	relay	5V	25mA
RL1301	1-515-309-00	relay	5V	25mA

Ref. No.	Part No.	Description		
RF-2 board				
RL3001	1-515-309-00	relay	5V	25mA
RL3002	1-515-309-00	relay	5V	25mA

SWITCH

Frame

SW101	1-513-254-00	slide;	CAMERA/LINE SELECT
SW102	1-514-524-00	slide;	BACK SPACE

RF-2 board

SW3001	1-552-510-00	toggle;	REC TEST/REC INHIBIT ON/OFF

SV-17/SV-18 board

SW4001	1-516-923-11	dip

TM-3 board

SW6001	1-552-102-00	digital;	10H
SW6002	1-552-102-00	digital;	1H
SW6003	1-552-102-00	digital;	10M
SW6004	1-552-102-00	digital;	1M
SW6005	1-552-676-00	push	
SW6006	1-516-925-21	dip	

DP-7 board

SW7001	1-516-994-00	lever;	TIME CODE/TIMER SELECT
SW7002	1-552-061-00	lever;	TIMER RESET
SW7003	1-552-677-00	push;	REW

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Ref. No.	Part No.	Description
SW7004	1-552-677-00	push; FF
SW7005	1-552-677-00	push; STBY
SW7006	1-552-677-00	push; STOP
SW7007	1-552-677-00	push; FWD
SW7008	1-552-677-00	push; REC
SW7009	1-552-678-00	rotary; BATT/RF/VIDEO/AUDIO SELECT

SL-4 board

SW8001	1-516-923-11	dip; NTSC/PS/PM SELECT

SP-2 board

SW9001	1-513-254-00	slide 2-4-3; CAMERA/MIC/LINE
SW9002	1-516-778-XX	slide 2-2-2; MIC/LINE
SW9003	1-513-254-00	slide 2-4-3; MIC/LINE/TC

PS-9 board

SW11001	1-552-679-00	rocker; POWER
SW11002	1-552-680-00	slide; EXT DC/BATTERY

TRANSFORMER

AU-10 board

T1101	1-427-456-00	trans.
T1201	1-427-456-00	trans.
T1301	1-427-456-00	trans.
T1401	1-433-205-00	trans. audio osc.
T1501	1-417-069-00	trans. matching
T1502	1-417-069-00	trans. matching

Ref. No.	Part No.	Description

RF-2 board

T3001	1-433-194-00	trans. osc.
T3002	1-425-942-00	trans. RF
T3003	1-425-942-00	trans. RF

SV-17/SV-18 board

T4200	1-433-205-00	trans. audio osc.

THERMISTOR

AU-10 board

TH1101	1-800-200-00	S3K
TH1201	1-800-200-00	S3K
TH1301	1-800-200-00	S3K
TH1401	1-800-200-00	S3K

TIMER

RF-2 board

TM3001	1-548-119-00	HOURS METER; HEAD HOURS

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Ref. No.	Part No.	Description
X'TAL		
SV-17/SV-18 Board		
X4001	**1-527-227-00**	**14.31818MHz**
SL-4 board		
X8001	**1-527-245-00**	**31.468KHz (NTSC ONLY)**
X8001	**1-527-259-00**	**31.25KHz (P/S ONLY)**

16-4. PACKING MATERIAL AND ACCESSORY (SUPPLIED)

Ref. No.	Part No.	Description
	1-551-652-00	**Cable with plugs, CCJQ 0.5m**
	1-508-172-00	Plug, 10P, female
	1-508-929-00	Plug, 14P, male
	3-658-242-00	Carton, individual
	3-658-243-00	Cushion, lower
	3-658-244-00	Cushion, upper
	3-658-245-00	Spacer
	3-701-633-00	**Bag, poly (for**
	3-701-644-01	**Bag, poly (for**
	Standard products	Empty reel, R1-9V

MISCELLANEOUS

1-548-122-00	**LIQUID CRYSTAL DISPLAY (DP-7)**
1-517-072-00	**holder; HOURS METER (RF-2), FUSE (SV-17/18)**

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SONY

PORTABLE VIDEOCORDER

BVH-500
BVH-500PS
BVH-500PM

SUPPLEMENT-3

TAPE PATH ADJUSTMENT

Please file this supplement on your first or second edition manual.

OPERATION AND MAINTENANCE MANUAL

9-966-461-83

Sony Corporation

1980.4 0914-1
© Printed in Japan

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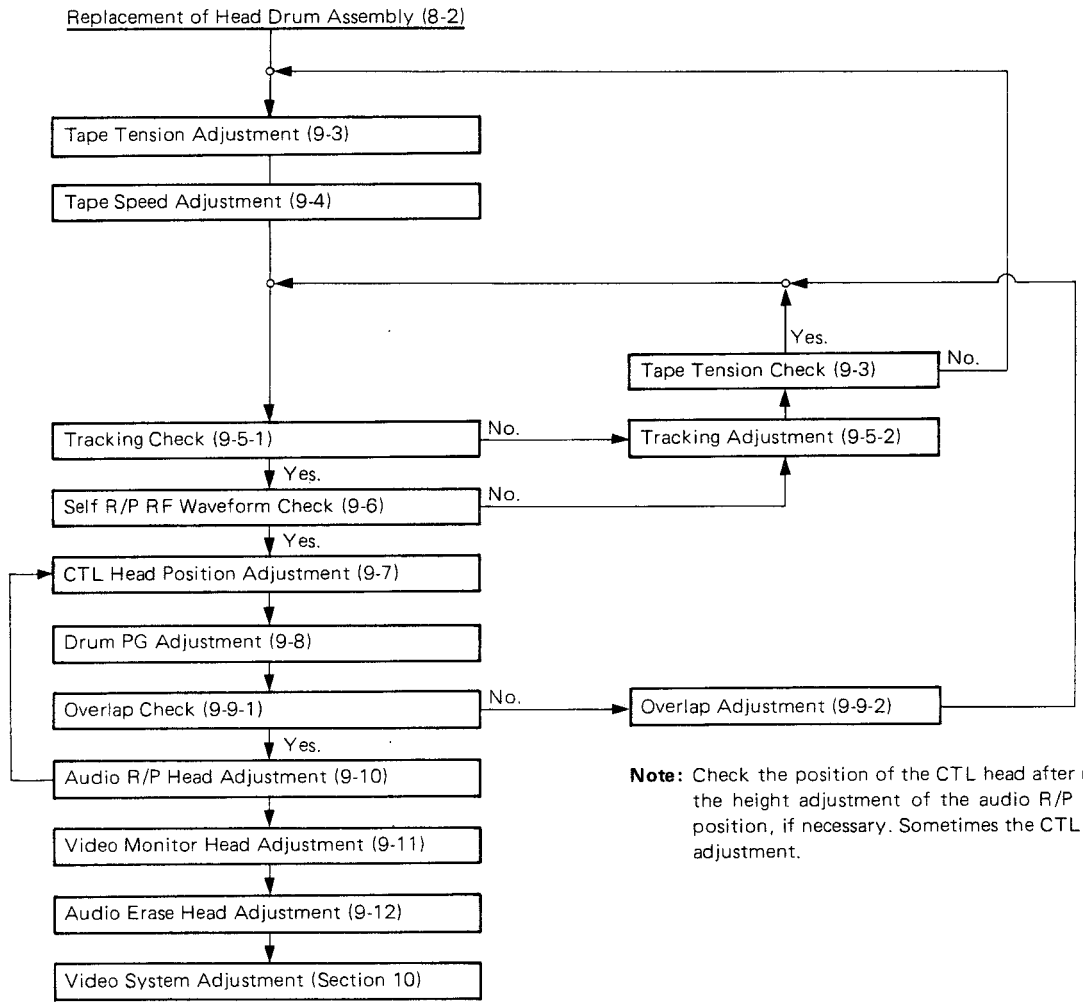
SECTION 9
TAPE PATH ADJUSTMENT

9-1. FLOW CHART OF CHECKS AND ADJUSTMENTS AFTER PRINCIPLE PARTS REPLACEMENT

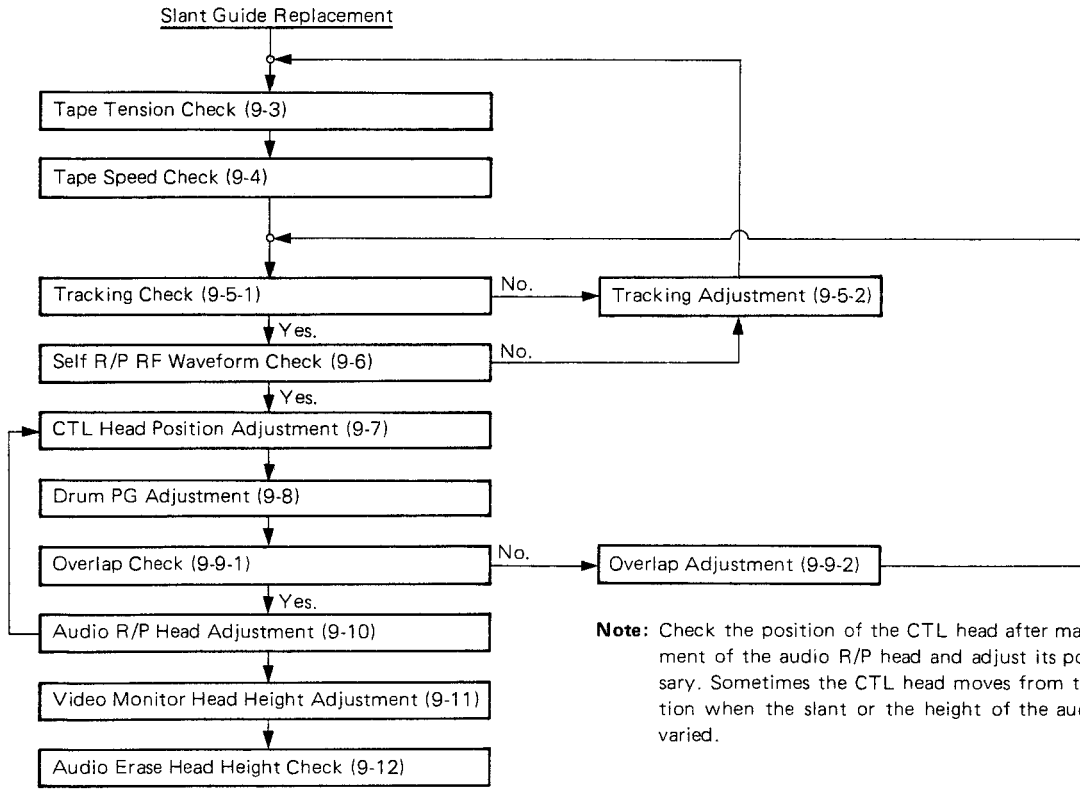
9-1-1. Checks and Adjustments After Head Drum Assembly Replacement

The number in the parentheses shows the reference section.



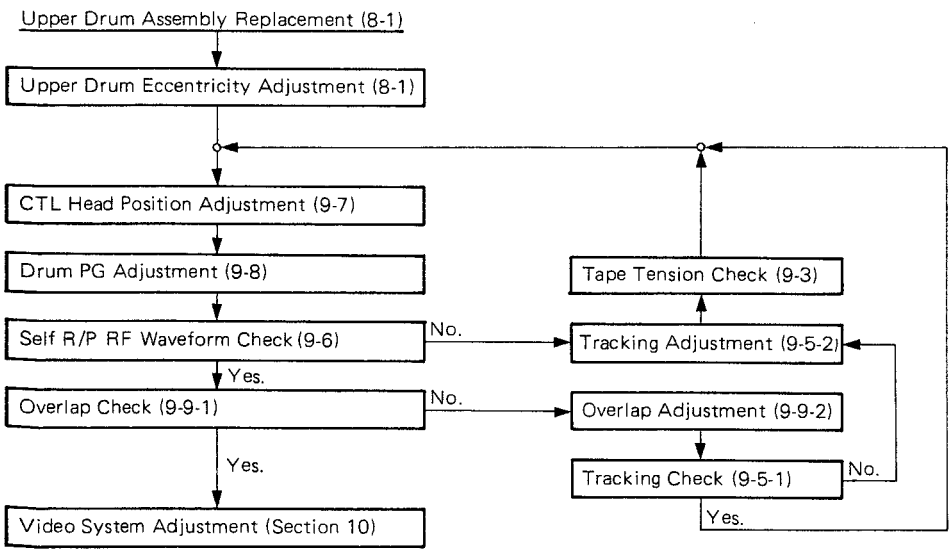
Note: Check the position of the CTL head after making the slant or the height adjustment of the audio R/P head and adjust its position, if necessary. Sometimes the CTL head moves during adjustment.

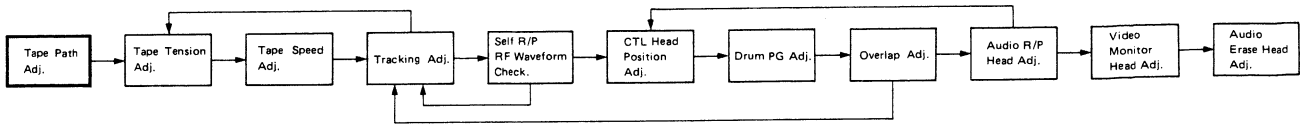
9-1-2. Checks and Adjustments After Slant Guide Replacement



Note: Check the position of the CTL head after making the adjustment of the audio R/P head and adjust its position, if necessary. Sometimes the CTL head moves from the correct position when the slant or the height of the audio R/P head is varied.

9-1-3. Checks and Adjustments After Upper Drum Replacement





9-2. TAPE PATH ADJUSTMENT

Do not adjust the tape path unless abolutely necessary because the tape path has been correctly adjusted at plant.

Preliminary Explanation

1. This adjustment is not for making wrinkles and scratches on the tape due to an abnormal tape running along the flanges of slant guides ① and ⑨ , fixed guides ② and ⑪ , guide rollers ③, ④ , ⑤ , ⑦ and ⑩ , counter roller ⑬ , tension arms ⑥ and ⑭ , and pinch roller ⑫ nor for causing a tape curl between the guides.
2. The tape path adjustment is to adjust the height and the slant of the guides between the "S" side slant guide and the supply reel table, and between the "T" side slant guide and the take-up reel table in reference to the position of the drum lead section.
3. Do not adjust guide rollers ③ , ④ , ⑤ , ⑦ and ⑩ shown in Fig. 9-1. If the guides are moved inadvertently or a part is replaced, install the guide on the machine after setting "L" shown in Fig. 9-2 with slide caliper.
4. Push the upper section of the guide by finger while checking the curl and insert a spacer under the guide to adjust the slant of the guide so that any curl along the guide roller or the counter roller disappears.
5. Utilize the bending jig of the tension arm to adjust the slant of the tension arm.

J-12, SONY Part No. J-604-165-0A

Adjustment Procedure

1. Insert a common tape without scratches and wrinkles and set up the PLAY mode.
2. Check that there is no tape curl nor incorrect tape run between the "S" side slant guide and the supply reel table.
   (1) If the tape curls along the flanges of "S" side slant guide ① and fixed guide ②:
   • Adjust the height of the "S" side slant guide. See Fig. 9-18.
   (2) If the tape curls along guide rollers ③ and ④:
   • Adjust the height and the slant of the guide, as explained in paragraphs 3 and 4 of the Preliminary Explanation.

Fig. 9-1. Adjust guides in this sequence

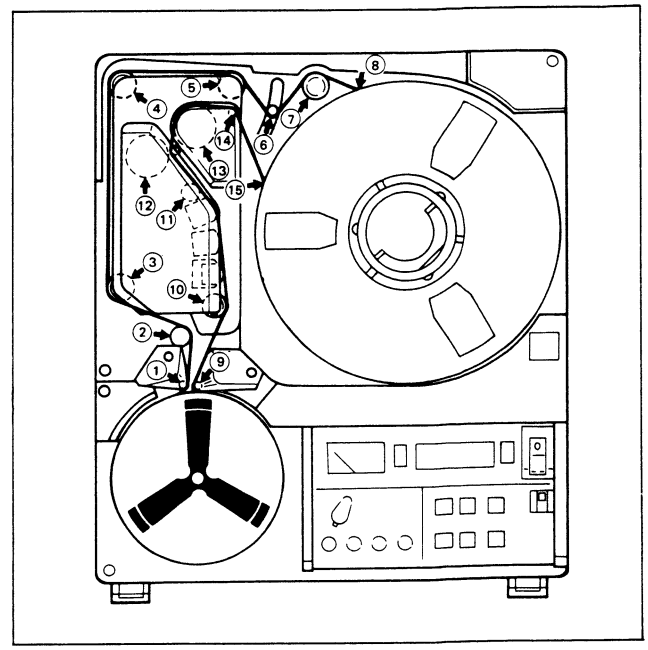
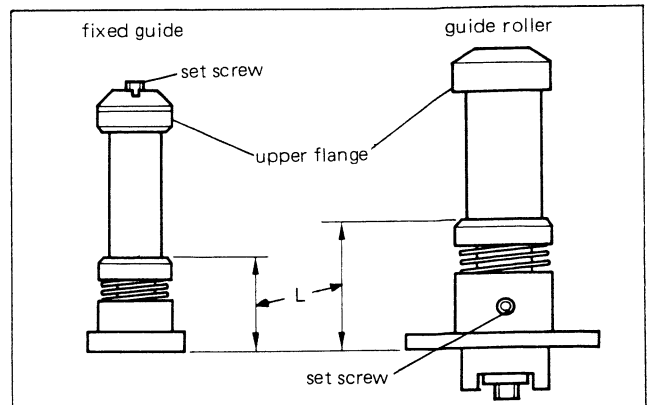


Fig. 9-2. Adjusting the height of guide



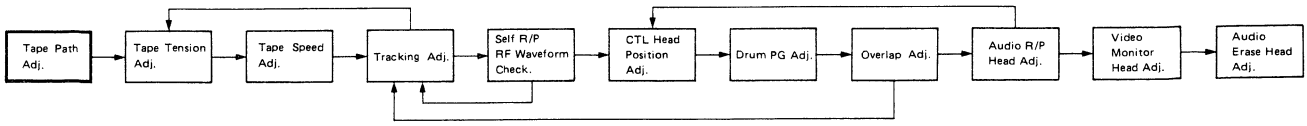
Guide no.	Height to lower flange L [mm]	Guide no.	Height to lower flange L [mm]
②	6.8 ± 0.1	⑦	27.3 ± 0.1
③	19.3 ± 0.1	⑩	18.5 ± 0.1
④	19.3 ± 0.1	⑪	18.5 ± 0.1
⑤	27.3 ± 0.1		

— Adjustment procedure —

(1) Loosen the set screw.

(2) Turn the upper flange to set height "L".
- Clockwise turn (↻): L becomes smaller.
- Counterclockwise turn (↺): L becomes larger.

(3) Tighten the setscrew.



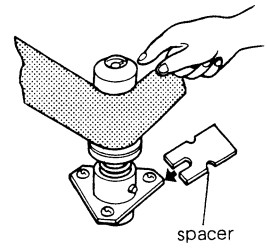
(3) If the tape curls around guide rollers (5) and (7) and tension arm (6):

- Adjust the height or the slant of the guide, as explained in paragraphs 3 and 4 of the Preliminary Explanation.
- Adjust the slant of tension arm (6) with the bending jig of the tension arm. See Fig. 9-4.

– NOTE –

Adjust the tension arm by bending it when a tape curl or an incorrect tape run is observed at points "A" or "B" shown in Fig. 9-6.

Fig. 9-3. Slant check of guide



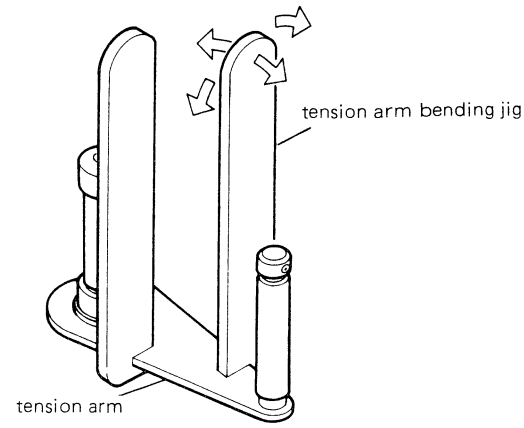
Check that the curl changes when the upper flange is pushed.

– NOTE –

Adjust counter roller and fixed guide in the same manner.

Thickness of spacer	SONY Part No.
0.02	3-651-334-01
0.05	3-651-334-11
0.1	3-651-334-21

Fig. 9-4. Bending adjustment of tension arm



3. Check that the tape does not touch the flange of the supply reel. If it does, adjust the height of the reel table by changing the rubber sheet for the one with a different thickness as following procedure.

(1) Remove the rubber sheet from the reel table. If adhesive remains on the reel table, wipe it off.

- If the tape touches the upper reel flange.
  ——►Use a thicker rubber sheet.
- If the pate touches the lower reel flange.
  ——►Use a thinner rubber sheet.

– NOTE –

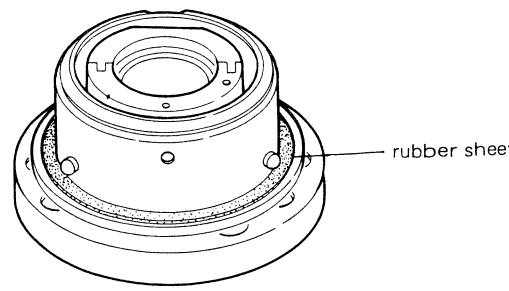
If the supply reel instalation onto the reel table becomes stiff after the reel is raised by the adjustment, change the rubber sheet back to the one used before, then perform the "Height Adjustment of Supply Reel Table by Adjustment Procedure B" in Section 5-1-3.

4. Check each tape guide from the "T" side slant guide to the take-up reel table to see that the tape runs correctly and does not curl.

(1) If the tape curls along the flange of "T" side slant guide (9) adjust the height of the "T" side slant guide. See Fig. 9-20.

(2) If the tape curls around guide roller (10) and fixed guide (11) adjust the height or the slant of the guide. Refer to paragraphs 3 and 4 of the Preliminary Explanation.

Fig. 9-5. Reel height adjustment



Tickness of rubber sheet	SONY Part No.
1. 475 mm	3-656-975-12
1. 575 mm	3-656-975-21
* 1. 675 mm	3-656-975-02
1. 775 mm	3-656-975-31
1. 875 mm	3-656-975-41
1. 975 mm	3-656-975-51

* Design value is 1.675 mm.

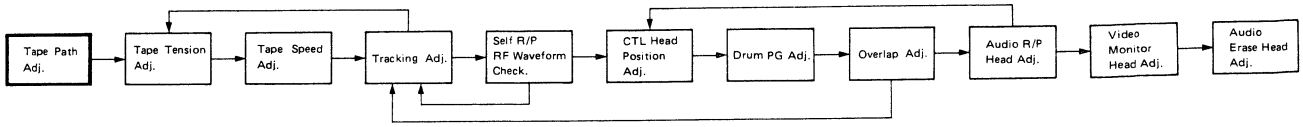


Fig. 9-6. Guide adjustment

– **NOTE** –

Check Flow Chart

Perform the following checks without fail after the height or the slant adjustment of guide rollers ⑩ and ⑪ .

The height and the azimuth of the audio R/P head, section 9-10

↓

The height and the azimuth of the video monitor head, section 9-11

↓

The height of the audio erase head, section 9-12

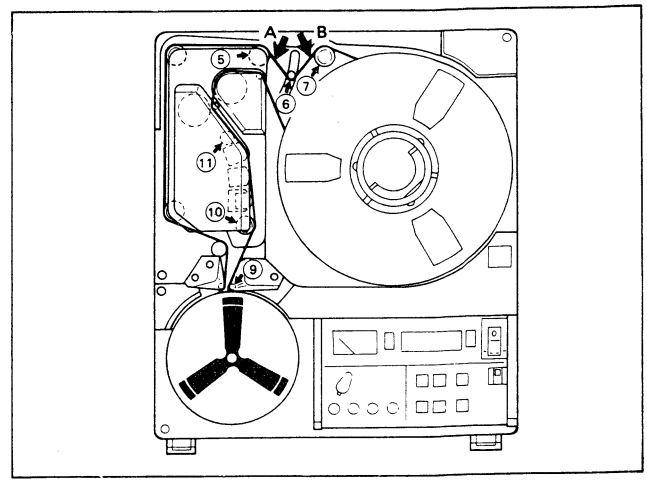


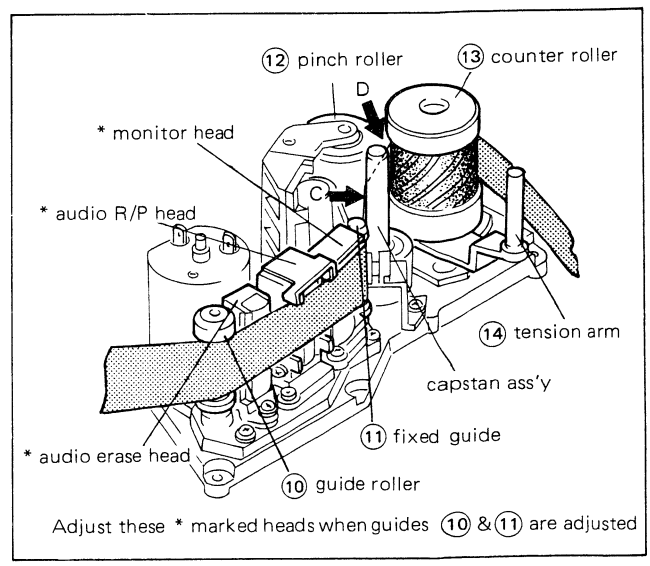
Fig. 9-7. Tape-path adjustment on the drive-chassis block

(3) If the tape at points "C" and "D" shown in Fig. 9-7 runs with uneven tension:

- Check that the capstan assembly is mounted correctly. Are the screws securing the assembly loose? Is the assembly slant?
- Check the slant (azimuth and inclination) of the pinch roller. Refer to Section 7-2, for the check and adjustment procedure.
- Check the slant of the counter roller in the same way the slant of the guide roller is checked. See Fig. 9-3.
- Adjust the slant or the height of fixed guide ⑪ .

– **NOTE** –

After the slant or the height of fixed guide ⑪ is adjusted, check the slant and the height of the fixed head, following the check flow chart in Step 4-(2).



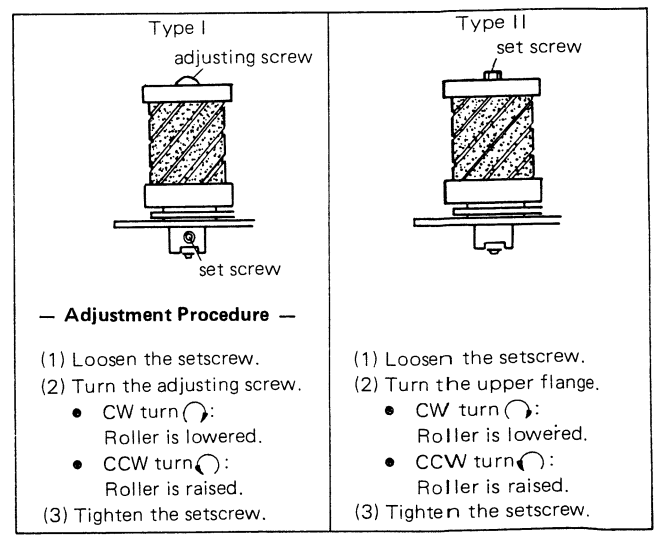
(4) If the tape curls around counter roller ⑬ and tension arm ⑭ :

- Adjust the height of counter roller. See Fig. 9-8.
- Adjust the slant of tension arm ⑭ with the bending jig of the tension arm.

– **NOTE** –

Fig. 9-8 Shows the two types of counter rollers used.

Fig. 9-8. Adjusting the height of the counter roller



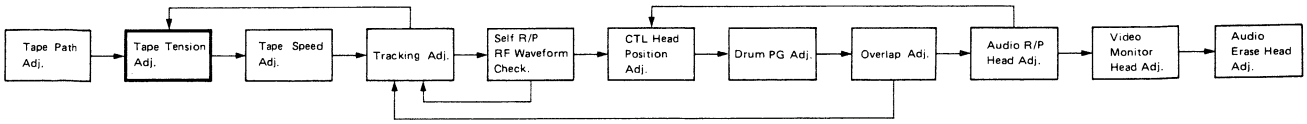
5. Check that the tape runs without touching the flange of the take-up reel. If it touches the flange, adjust the reel table height. Refer to Step 3 and Fig. 9-5.

– **NOTE** –

If the reel cannot be easily installed on the take-up reel table after this adjustment, adjust the reel table height, as explained in Height Adjustment of Take-up Reel Table by Adjustment Procedure B, Section 5-1-2.

6. Perform the checks described in Steps 2 to 5 in the F.FWD and the REW modes.

7. Check that the setscrews of the guides are tightened.



9-3. TAPE TENSION ADJUSTMENT

Preliminary Explanation

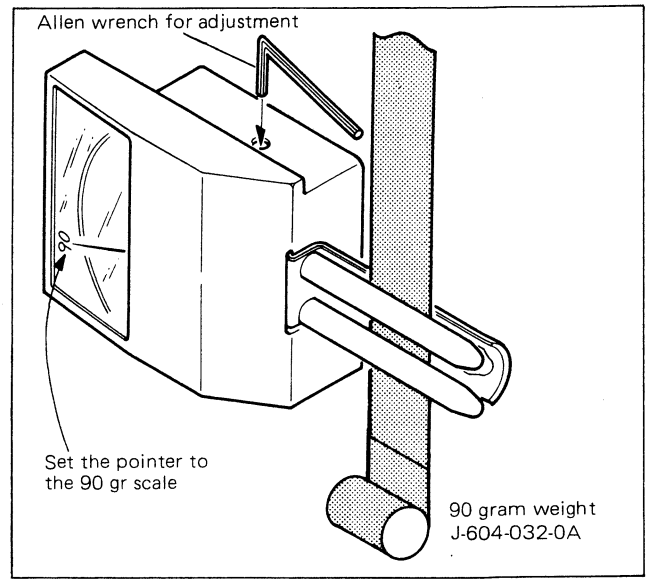
1. The tape tension of this machine must be checked and, if necessary, adjusted, if a skew distortion is obvious when the tape recorded on this machine is played back on another machine, such as the BVH-1100.
2. Sometimes the tape tension changes after the slant guide adjustment. Be sure to check tape tension after the slant guide adjusting.
3. The tension meter mentioned below is recommended as an instrument to measure for the tape tension.

Tentelometer: TH-H12-2 J-9 SONY Part No. J-604-168-0A

4. Calibrate the tension meter without fail before use, as shown in Fig. 9-9. Use the following weight of 90 grams to calibrate.

J-11, SONY Part No. J-604-169-0A

Fig. 9-9. Calibration of tension meter



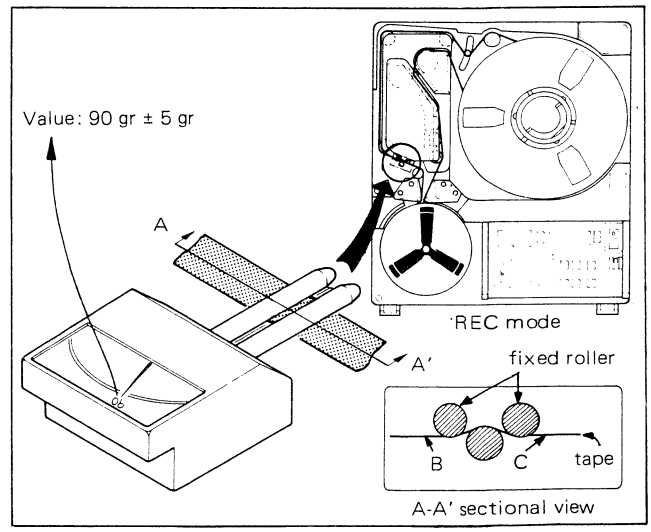
Check Procedure

1. Remove the S guide cover, the T guide cover, the drum panel, and the reel panel. Stand the machine up vertically.
2. Thread a tape without any wrinkles and scratches and record a color bar or other video signal.
3. Measure the tape tension at the point shown in Fig. 9-10 to check that the meter reads between 85 and 95 grams. If the reading does not satisfy this specification, adjust as follows.

— **NOTE** —

Set the tension meter so that the tape is threaded as shown in the A-A' sectional view in Fig. 9-10, so that the wrapped angles of the tape against the two fixed rollers are equal, and so that there are no wrincle at points B and C sections.

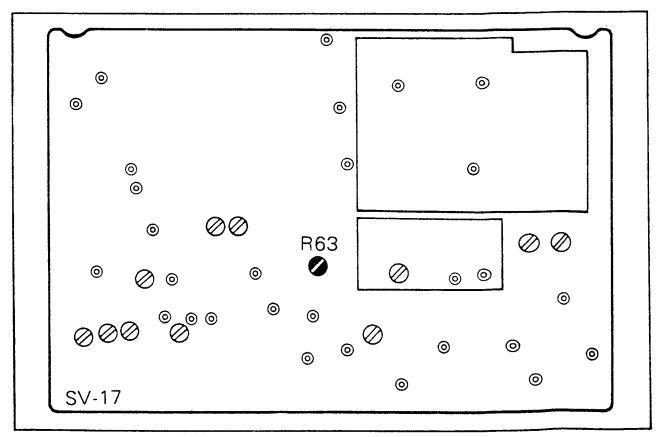
Fig. 9-10. Tape tension check

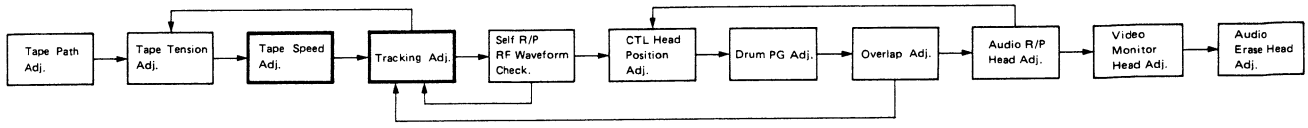


Adjustment Procedure

1. Adjust R63 on the SV-17 (or SV-18) board for a tape tension of 90 grams. See Fig. 9-11.

Fig. 9-11. Adjustment of tape tension SV-17 (or SV-18) board





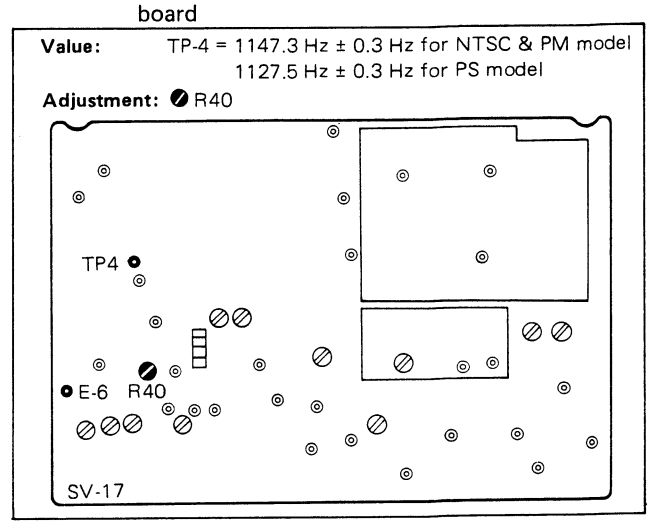
9-4. TAPE SPEED ADJUSTMENT

A frequency counter is required for this adjustment.

Check and Adjustment Procedure

1. Connect a frequency counter between TP-4 and GND on the SV-17 (or SV-18) board.
2. Thread a tape, supply the machine with a color bar or other video signal, and set up the REC mode. Check that the counter reading satisfies the value shown in Fig. 9-12.
3. If this value is not satisfied, adjust R40 on the SV-17 (or SV-18) board.

Fig. 9-12. Tape speed adjustment SV-17 (or SV-18) board



9-5. TRACKING CHECK AND ADJUSTMENT

9-5-1. Tracking Check

Preliminary Explanation

1. The compatibility of the machine is checked by checking the shape of the playback RF envelope of an alignment tape.
2. If the upper drum has been replaced, adjust the drum eccentricity to less than 5μm and run the tape for 20 minute to break in the new upper drum before performing the tracking check.

Check Procedure

1. Connect an oscilloscope as shown in Fig. 9-13.

   – **NOTE** –

   The RF waveform can be observed when the oscilloscope is connected between pin 9 (HOT) and pin 8 (GND) of the 24 pin connector for the playback adaptor.

2. Play back the "WHITE" segment of an alignment tape.
3. Set the TRACKING switches as follows.

   SW1-1 on the SV-17 (or SV-18) board . . . . . OFF
   SW1-2 . . . . . .ON

   This setting is called the "variable state" setting. Turn R24 until the RF envelope is as wide as possible. Check the ratio of the minimum and the maximum video levels is more than 70% and the ratio of the minimum and the maximum sync levels is more than 60%. If these values are not satisfied, adjust the tracking.

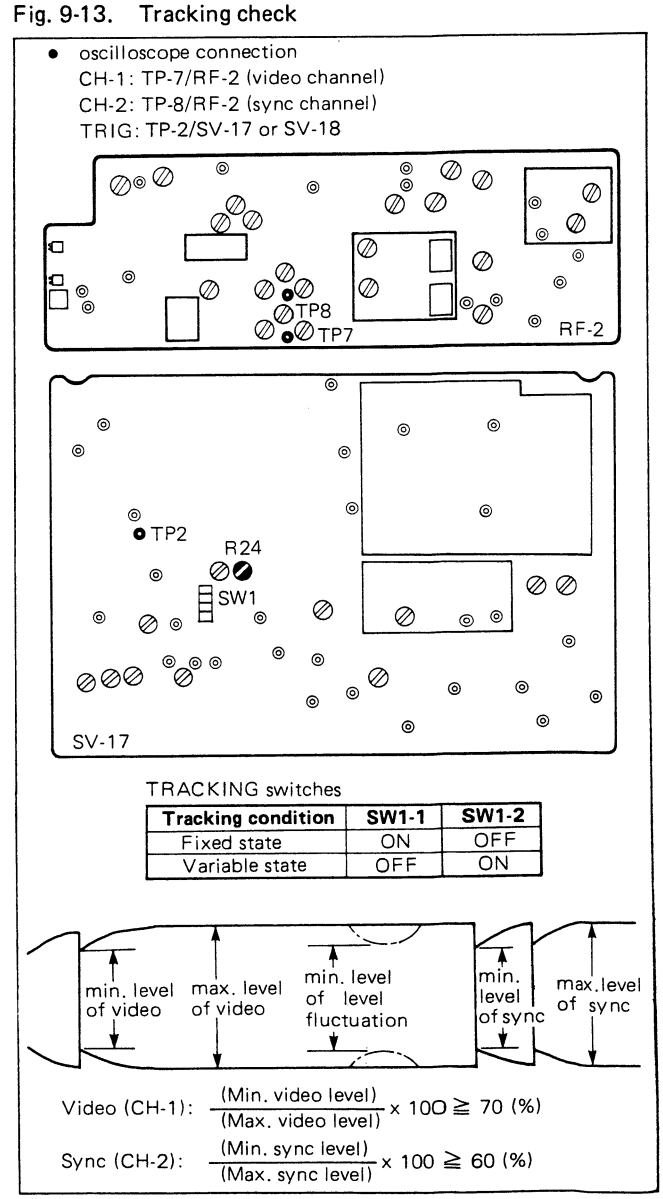
   – **NOTE** –

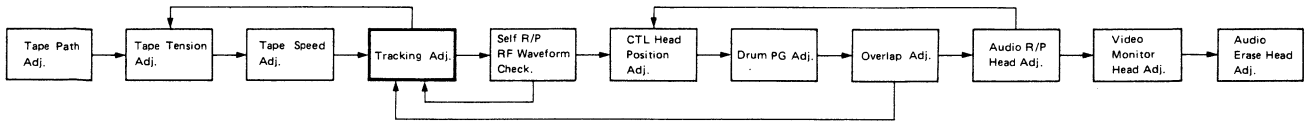
   The TRACKING switches must be reset to the "fixed state" setting after this check: set SW1-1 on the SV-17 (or SV-18) board to ON and SW1-2 to OFF. If a recording is made while the switches are in the variable state setting, the recording will have a tracking error, the extent of which depends on the setting of R24.

4. Check that the video level fluctuation satisfies this condition:

$$\frac{\text{(Max. video level)} - \text{(Min. video level)}}{\text{(Max. video level)}} \times 100 \leqq 15\ (\%)$$

Fig. 9-13. Tracking check





9-5-2. Tracking Adjustment

Preliminary Explanation

1. This adjustment is to make the heads trace the record pattern of the alignment tape correctly and to contact the tape properly so that the tape recorded on this machine can be played back on other machine.

2. The points of the tracking adjustment are as follows.

   (1) The tracking is adjusted by adjusting the slants of the "S" and "T" side slant guide posts and by adjusting the height of the guide flange.

   (2) The adjustment must be started from the "S" side slant guide (on the tape entrance side).

   (3) The RF envelope waveform on the tape entrance side is varied by adjusting the slant and the height of the "S" side slant guide post. The waveform on the tape exit side is varied by adjusting the slant and the height of the "T" side slant guide post. See Fig. 9-14.

   (4) The proper height adjustment of the "S" side slant guide assures that there is no curl along the both flanges of the "S" side guide and the fixed guide in front of the "S" side guide. The height of the fixed guide may also need adjustment.

   (5) Check the direction (upward or downward) in which the tape must be moved and the side (upper or lower) of the tape on which tension must be increased before turning the adjusting screw of the slant guide by lightly pushing the back of the tape as shown in Fig. 9-15.

   (6) Make as much of the Tracking adjustment as possible by adjusting the slant of the slant guide post.

   – NOTE –

   Be careful when turning the height adjusting screw that the guide flange does not press the tape excessively.

3. Always check the tape tension after making the tracking adjustment. Refer to Section 9-3. Sometimes the tape tesion may change during the slant guide adjustment.

Fig. 9-14. RF envelope and adjusting guide

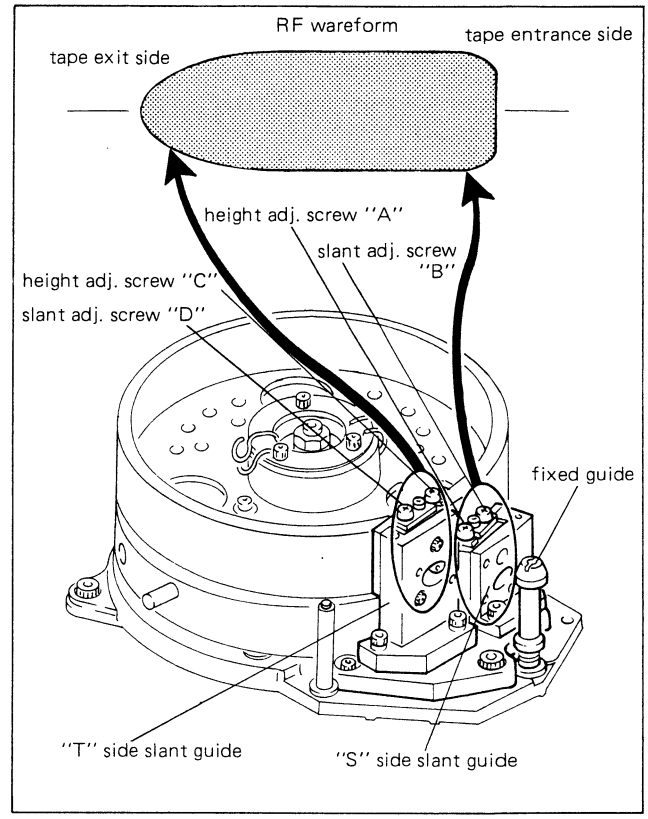
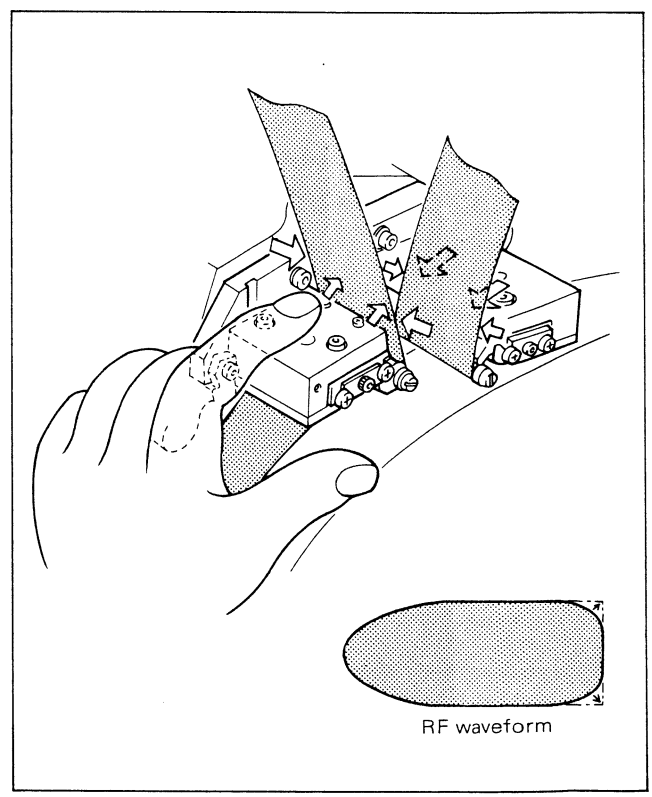
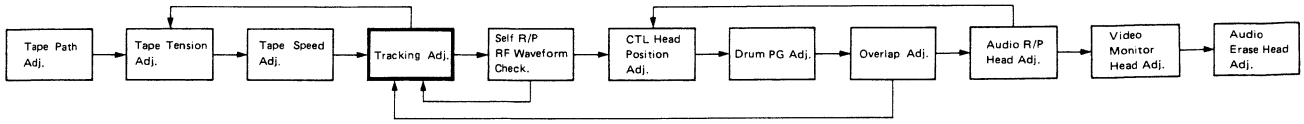


Fig. 9-15. Check before adjustment





Adjustment Procedure

Preparation before adjustment

1. Connect an oscilloscope as shown in Fig. 9-16.

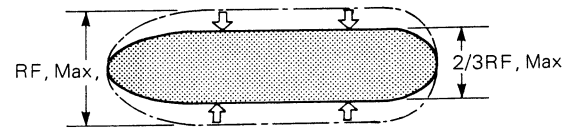
   – NOTE –

   The RF waveform can be also observed when the scope is connected to pin 9 (HOT) and pin 8 (GND) of the 24 pin connector for the playback adaptor.

2. Play back the "WHITE" segment of an alignment tape.
3. Set the TRACKING switches to the varied state (SW1-1 on the SV-17 (or SV-18) board to OFF and SW1-2 to ON). Turn R24 clockwise or counterclockwise so that the RF level is 2/3 of its maximum.

Fig. 9-16. Preparation before slant guide adjustment

* Oscilloscope connection (See Fig. 9-13.)
  CH-1: TP7/RF-2
  CH-2: TP8/RF-2
  TRIG: TP2/SV-17 (or SV-18)
* Play back the "White" segment of alignment tape BR5-2
* Tracking switch settings: [SV-17 (or SV-18) board]
  SW1-1 . . . . . OFF
  SW1-2 . . . . . ON
* ◐ R24



Slant adjustment of "S" side guide

4. Loosen the two slant lock screws shown in Fig. 9-17 1/10 to 1/4 turn.

   – NOTE –

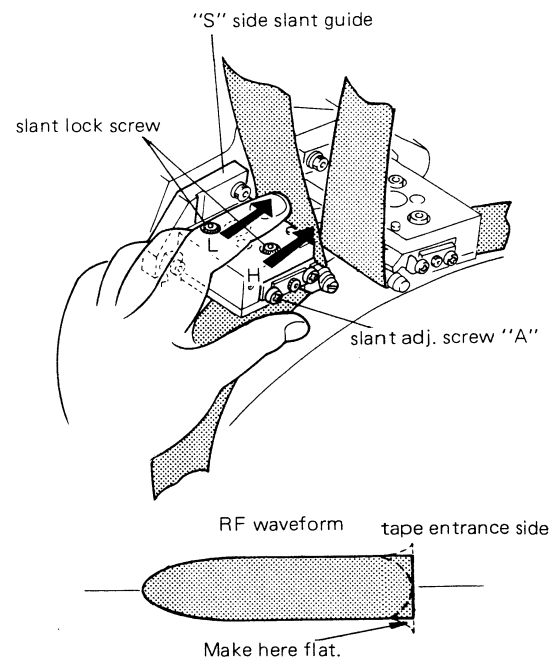
   Do not loosen the screws too much. If the screws are loosen excessively, the RF waveform tends to may change when the screws are tightened after the adjustment.

5. Lightly push in the back of the tape at points "H" and "L" shown in Fig. 9-17 and find the point where the RF waveform on the tape entrance side is most flat. Then adjust the slant adjusting screw "A" as shown in Fig. 9-17.
6. Tighten the two slant lock screws after the adjustment and check that the RF waveform is unchanged.

   – NOTE –

   If these screws are not tightened, the slant guide may change position when the height is adjusted.

Fig. 9-17. Slant adjustment of "S" side slant guide



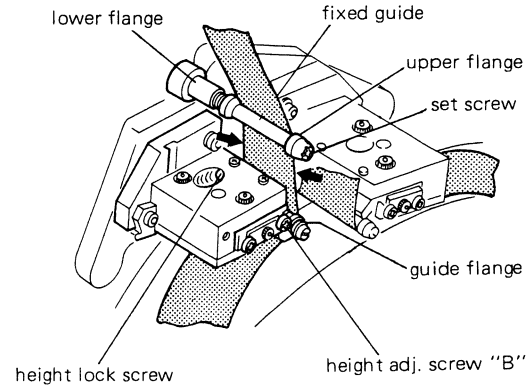
— Adjustment —

- If the RF waveform flatten when point "L" is pushed, turn adjustment screw "A" clockwise ↻ .
- If the RF waveform flatten when point "H" is pushed, turn the adjustment screw "A" counter clockwise ↺.

Height adjustment of "S" side slant guide

7. Check that there are no tape curls along the guide flange and the upper and lower flanges of the fixed guide shown in Fig. 9-18. If the tape curls, adjust the height of the guide as in Fig. 9-18.
8. Check that the RF waveform on the tape entrance side is flat. If the waveform is not flat, repeat Steps 4 to 7 until the waveform becomes flat as possible.
9. Adjust the height adjusting screw "B" finely for a flat RF waveform.
10. Tighten the setscrew of the fixed guide and the lock screw of the "S" side slant guide. Check that the RF waveform remains flat. If it has changed, repeat Steps 4 to 8.

Fig. 9-18. Height adjustment of "S" side slant guide



To adjust the "S" side slant guide

(1) Loosen height lock screw 1/10 to 1/4 turn. Do not loosen it excessively.
(2) Turn adjusting screw "B".

- If tape curls along guide flange, turn clockwise ↻.
- If tape is away from guide flange, turn counterclockwise ↺.

To adjust the fixed guide

(1) Loosen setscrew.
(2) Turn upper flange.

- If tape curls along upper flange, turn counterclockwise ↺.
- If tape curls along lower flange, turn clockwise ↻.

Slant adjustment of "T" side slant guide

11. Loosen the two slant lock screws shown in Fig. 9-19 1/10 to 1/4 turn.

— **NOTE** —

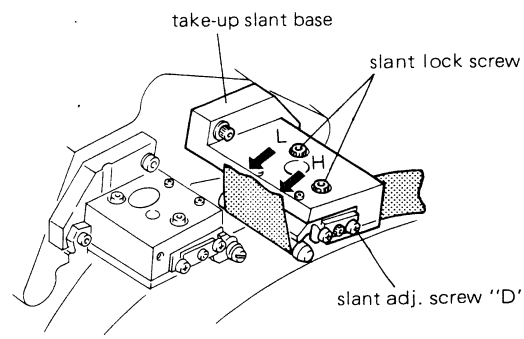
Do not loosen the screws too much. If the screws are loosened too much, the RF waveform may change when the lock screws are tightened after the adjustment.

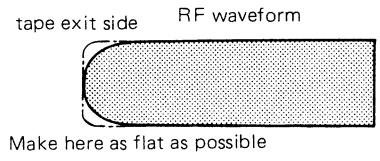
12. Lightly push in the back of the tape at points "H" and "L" shown in Fig. 9-19 by finger and find the point where the RF waveform on the tape exit side is as flat as possible. Adjust slant adjusting screw "D" as shown in Fig. 9-19.
13. Tighten the two slant lock screws after the adjustment and check that the RF waveform remains unchanged.

— **NOTE** —

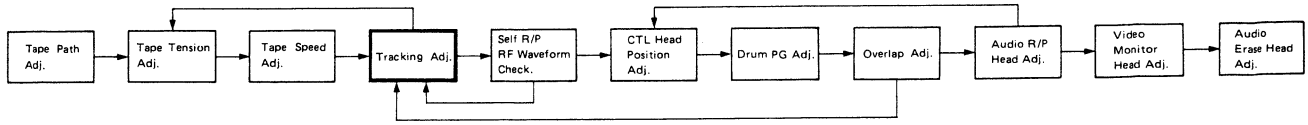
Do not forget to tighten these screws, or the slant tends to change during the height adjustment.

Fig. 9-19. Slant adjustment of "T" side slant guide





- If the RF waveform flatten when tape is pushed at "L", turn screw "D" clockwise ↻.
- If the RF waveform flatten when tape is pushed at "H", turn screw "D" counterclockwise ↺.



Height adjustment of "T" side slant guide

14. Check that the tape does not curl along the flange of the "T" side guide. If it does, adjust the height of the guide flange as in Fig. 9-20.

– NOTE –

The tape should just contact the guide flange, not press against it storongly.

15. Check that the RF waveform on the tape exit side is as flat as possible. If it is not, repeat Steps 10 to 14 until it is as flat as possible.

16. Adjust the height adjusting screw "C" finely so that the RF waveform becomes almost flat.

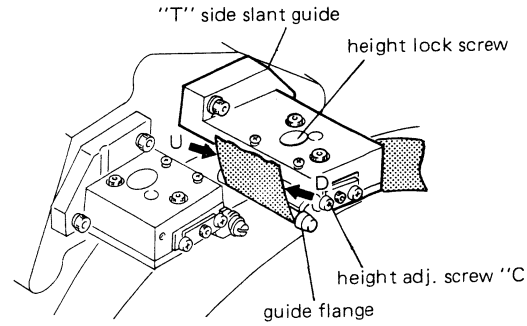
17. Tighten the height lock screw and check that the RF waveform is unchanged. If the waveform is changed, repeat Steps 11 to 16.

18. Reset the TRACKING switches to the fixed state [SW1-1 on the SV-17 (or SV-18) board to ON and SW1-2 to OFF].

– NOTE –

Do not forget to reset the TRACKING switches to the fixed state, or the tracking of the record to be made will be erred.

Fig. 9-20. Height adjustment of "T" side slant guide



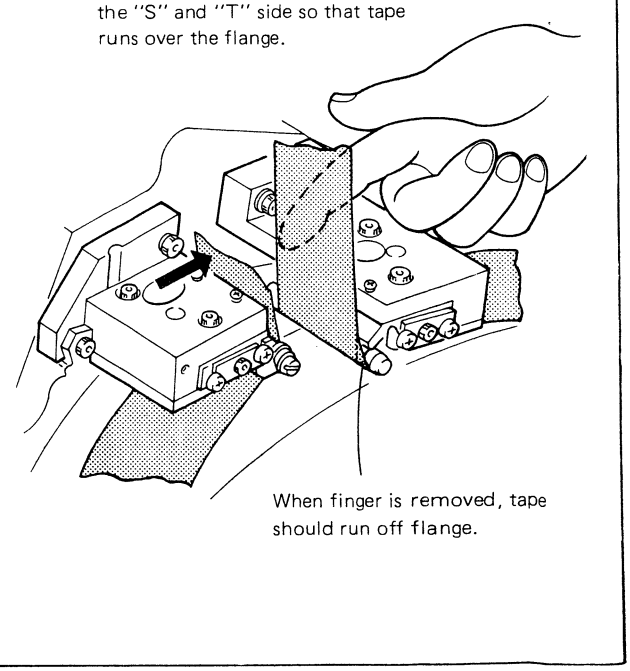
— Adjustment —

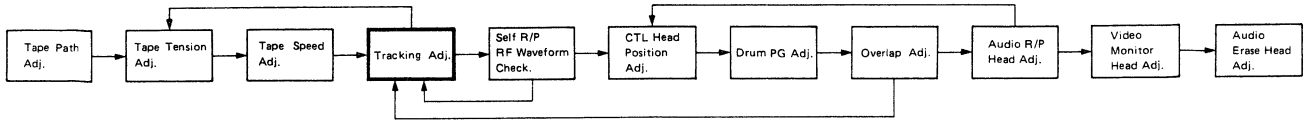
(1) Loosen lock screw 1/10 to 1/4 turn. Do not turn too much.
(2) Turn adjusting screw "C".
- If tape curls along flange, turn it clockwise ↻.
- If tape is away from flange, turn it counterclockwise ↺.
- If RF waveform becomes flat when tape is pushed in the "D" direction, turn it counterclockwise ↺.
- If RF waveform becomes flat when tape is pushed in the "U" direction, turn it clockwise ↻.

Check after adjustment

19. Thread a recorded tape and set up the PLAY mode. Push the lower edge of the back of the tape near the guide by finger, as shown in Fig. 9-21, so that the tape is forced to move while it is running onto the guide flange. Check that the normal tape movement and the original RF waveform are restored when the tape is released from finger. If normal tape movement is not restored, check the following points and perform any adjustment necessary.
- Is tension on the lower side of tape too strong?
- Does the slant guide flange press too strongly against the tape ?

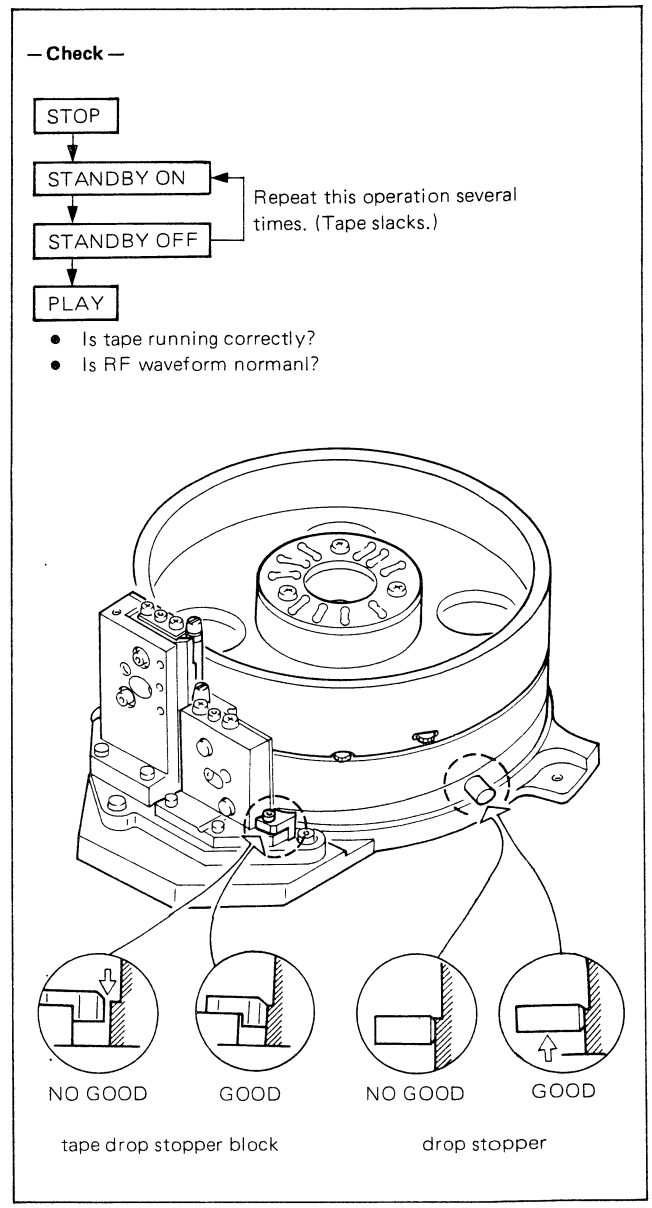
Fig. 9-21. Check of tape running into guide flange

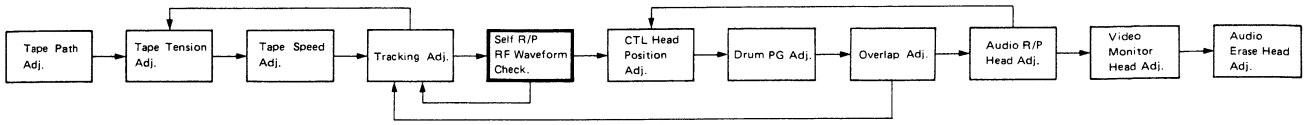




20. Place the machine horizontally. Play back a recorded tape and remember the RF waveform during playback. Set up the STOP mode and repeat the on and off operation of the STANDBY button several times so that the tape slacks around the drum. Check that the RF waveform return normal when the PLAY mode is set up. If the RF waveform does not return to normal, check whether the tape drop stopper block and the drop stopper shown in Fig. 9-22 are mounted correctly.

Fig. 9-22. Tape loose check





9-6. SELF RECORD/PLAYBACK RF WAVEFORM CHECK

Preliminary Explanation

1. The contact of the tape with the rotary heads is checked by observing the RF waveform.

2. When the upper drum has been replaced, run the tape for about 20 minutes to break the new drum in before making this check.

Check Procedure

1. Connect an oscilloscope as shown in Fig. 9-23.

   – NOTE –

   The RF waveform can be also observed if the scope is connected to pin 9 (HOT) and pin 8 (GND) of the 24 pin connector for the playback adaptor.

2. Check that the TRACKING switches are in the fixed position.

3. Thread a tape and record a color bar signal.

4. Play back the recorded segment and check that the RF waveforms of the video and the sync satisfy the values shown in Fig. 9-24. If these values are not satisfied, perform the tracking adjustment in section 9-5-2 again. If, after performing the tracking adjustment again, these values are not satisfied, adjust the slant guide as follows.

   (1) Tape entrance side: Adjust the slant of the "S" side slant guide so that tension on the top of the tape becomes stronger.

   (2) Tape exit side: Adjust the slant of the "T" side slant guide so that tension on the bottom of the tape becomes stronger.

Fig. 9-23. Self record/playback RF check

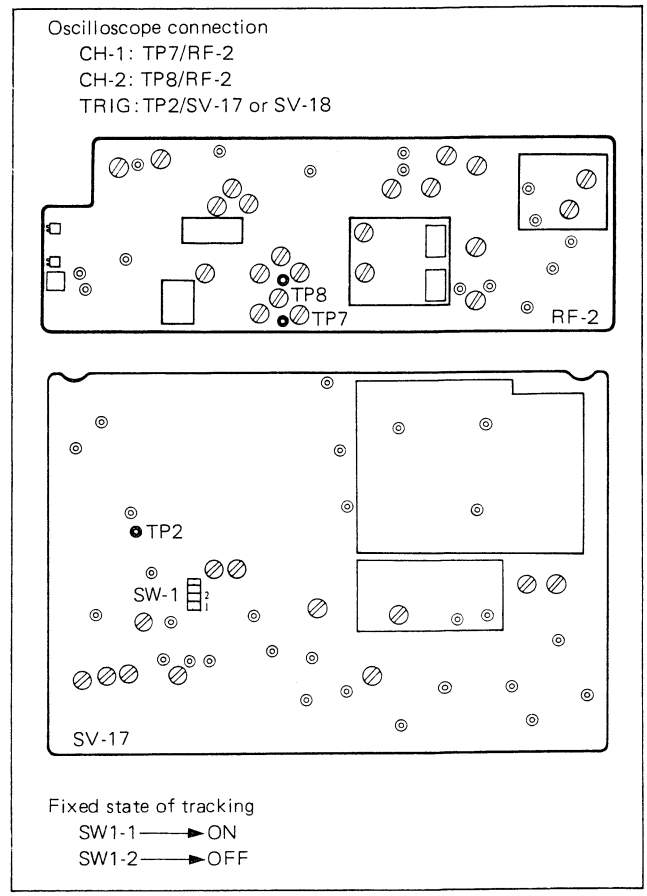
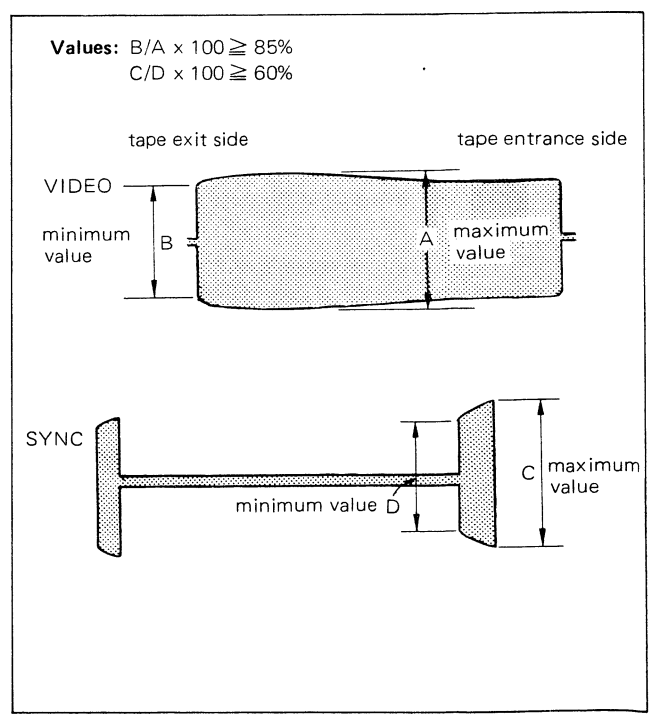
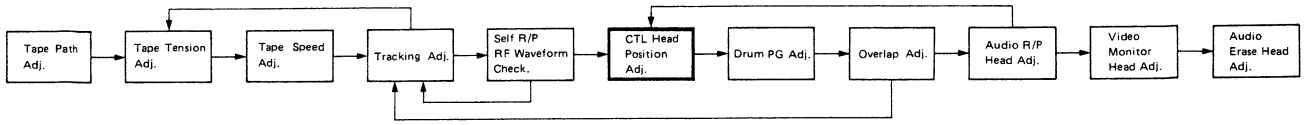


Fig. 9-24. Self record/playback RF waveform check (specified values)





9-7. CTL HEAD POSITION ADJUSTMENT

Preliminary Explanation

1. If the CTL head has been mounted incorrectly the tape recorded on a different machine cannot be played back correctly on this machine.
2. Play back an alignment tape. Compare the RF waveform when the TRACKING switches are in the fixed position with the largest RF waveform made by TRACKING volume control R24 on the SV-17 (or SV-18) board when the TRACKING switches are in the variable positions. If the former RF waveform is identical with the latter RF waveform, the position of the CTL head is correct.
3. Since the drum PG phase deviates a great deal when the CTL head is moved, the drum PG phase must always be adjusted after the adjustment of the CTL head.

Check and Adjustment Procedure

Check

1. Connect the CH-1 probe of the oscilloscope to TP10/RF-2 (RF OUT).

   – NOTE –

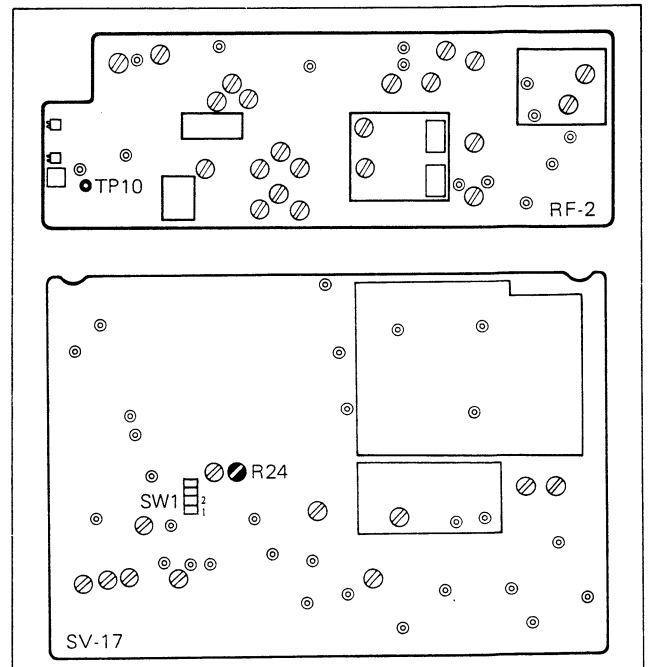
   The scope can also be connected to pins 9 (HOT) and 8 (GND) of the 24 pin connector for the playback adaptor.

2. Set the TRACKING switches to the variable position. [Set SW1-1 on the SV-17 (or SV-18) board to OFF and SW1-2 to ON.]
3. Play back the "WHITE" segment of the alignment tape. Remember the largest RF waveform made by the TRACKING volume control, R24 on the SV-17 (or SV-18) board.
4. Reset the TRACKING switches to the fixed position [SW1-1 on the SV-17 (or SV-18) board to ON and SW1-2 to OFF] and check that the RF waveform remains unchanged. If the waveform changes follow the adjustment procedure below.

Adjustment

5. Loosen the four screws marked by asterisk (★) and the screw fixing the stopper shown in Fig. 9-26 by 1/2 turn.
6. Check that the TRACKING switches are in the fixed position. Move the head base in the "A" or "B" direction shown in Fig. 9-26 so that the RF waveform is the same as you remember in Step 3.
7. Repeat Steps 2 to 4 and check that the CTL head is mounted in the correct position. If it is not, repeat Step 6 and Steps 2 to 4 until the position of the CTL is correct.
8. Fix the head base with the four screws. Turn the stopper clockwise until it touches the head base and tighten the screw to fix the stopper.
9. Check that the TRACKING switches are in the fixed positions.

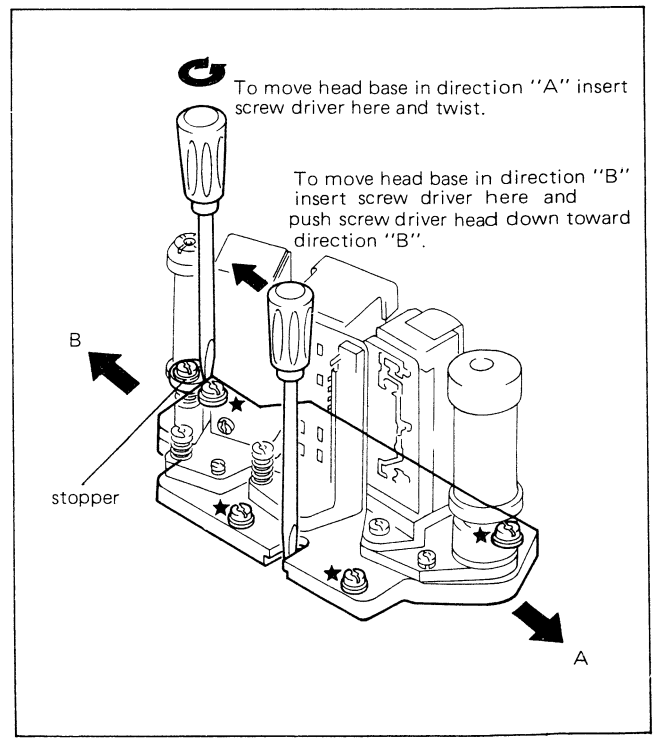
Fig. 9-25. Check of CTL head position

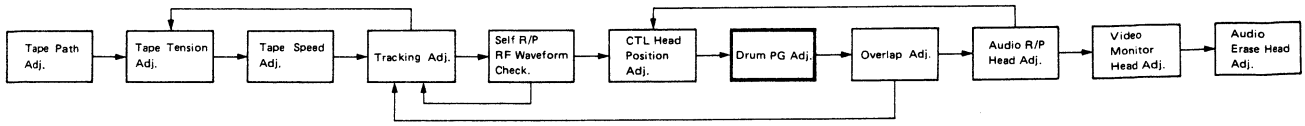


TRACKING switches

Tracking condition	SW1-1	SW1-2
Fixed condition	ON	OFF
Variable condition	OFF	ON

Fig. 9-26. Adjustment of CTL head position





9-8. DRUM PG ADJUSTMENT

Preliminary Explanation

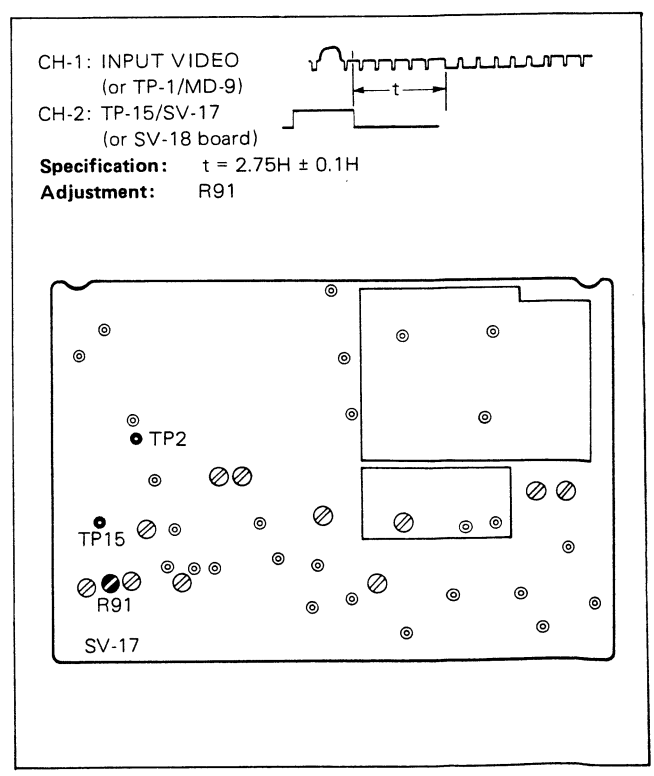
1. If the Drum PG is not adjusted properly, the following can happen.
   - When a recorded tape on this machine is played back on another machine such as BVH-1100, part of playback picture is missing.
   - When a tape recorded on this machine is palyed back on another machine the edit operation is impossible because of AUTO PG operation does not work. (The VH lamp does not turn on.)
2. The drum PG adjustment is done in two stages relating to the rotary phase drum.
   (1) Drum PG lock adjustment (9-8-1):
   The adjustment of the phases of the INPUT VIDEO and the PG LOCK.
   (2) Drum PG phase adjustment (9-8-2):
   The adjustment to bring the phase of the VIDEO OUT into phase with INPUT VIDEO.
   – NOTE –
   Always perform these two adjustment in this order.
3. Do not set the machine in the ADVANCE mode during this adjustment. If the CLP-550 is used, turn off the INT. ADV switch on the SP-3 board.

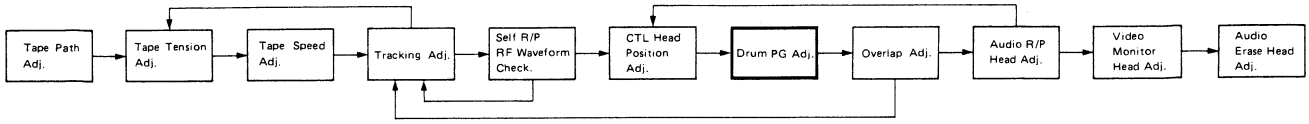
9-8-1. Drum PG Lock Adjustment

Check and Adjustment Procedure

1. Connect an oscilloscope as follows.
   CH-1: INPUT VIDEO (TP-1/MD-9)
   CH-2: TP-15/SV-17 (or SV-18)
   TRIG: TP-2/SV-17 (or SV-18)
2. Thread a tape and record a color bar signal.
3. Check that the phases of the CH-1 and the CH-2 satisfy the specification shown in Fig. 9-27. If the specification is not satisfied, adjust R91 on the SV-17 (or SV-18) board.

Fig. 9-27. Drum PG lock adjustment





9-8-2. Drum PG Phase Adjustment

Check and Adjustment Procedure

1. Connect an oscilloscope as follows.
   CH-1: INPUT VIDEO (TP-1/MD-9)
   CH-2: VIDEO OUT
   TRIG:TP-2/SV-17 (or SV-18)
2. Play back the color bar segment of an alignment tape.
3. Check that the phases of the INPUT VIDEO and the VIDEO OUT satisfy the specification shown in Fig. 9-28. If the specification is not satisfied, adjust R89/SV-17 (or SV-18) board.
4. If the phase cannot be adjusted by R89, adjust the position of the PG coil inside the head drum.

Mounting Position Adjustment of PG Coil

– NOTE –

Adjust the position of the PG coil so that the phases of the INPUT VIDEO and the VIDEO OUT are within 30μsec. and adjust R89 finely so that the phases are within 5μsec.

5. Set R89 to its mechanical center.
6. Set up the STOP mode. Stop the upper drum at the point where the PG coil mounting plate can be seen through the hole on the upper drum, as shwon in Fig. 9-29.
7. Turn the screw securing the PG coil 1/4 to 1/2 turn. Move the PG coil mounting plate with a flat blade screwdriver as indicated in Fig. 9-29.
8. Tighten the screw while pushing the PG coil mounting plate toward the drum shaft (in the direction shown by arrow "C" in Fig. 9-29).
9. Check that the phase difference between the VIDEO OUT (CH-2) and the INPUT VIDEO (CH-1) is within 30μsec. If it is not, repeat Steps 6 to 8.
10. Readjust R89 so that the phase difference is within ± 5μsec.

– NOTE –

If the tape tension, the slant guide, and/or the CTL head position are adjusted after drum PG adjustment, the drum PG adjustment must be done again.

Fig. 9-28. Drum PG phase adjustment

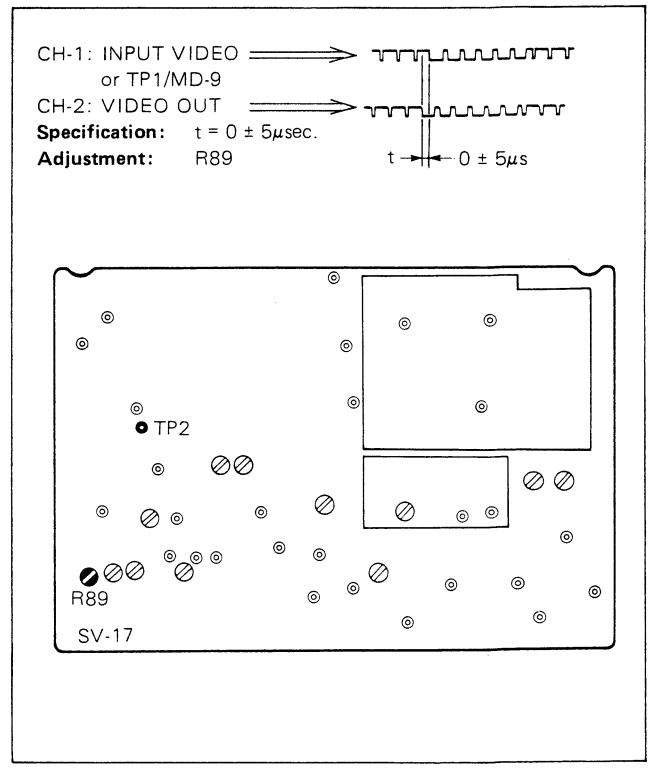
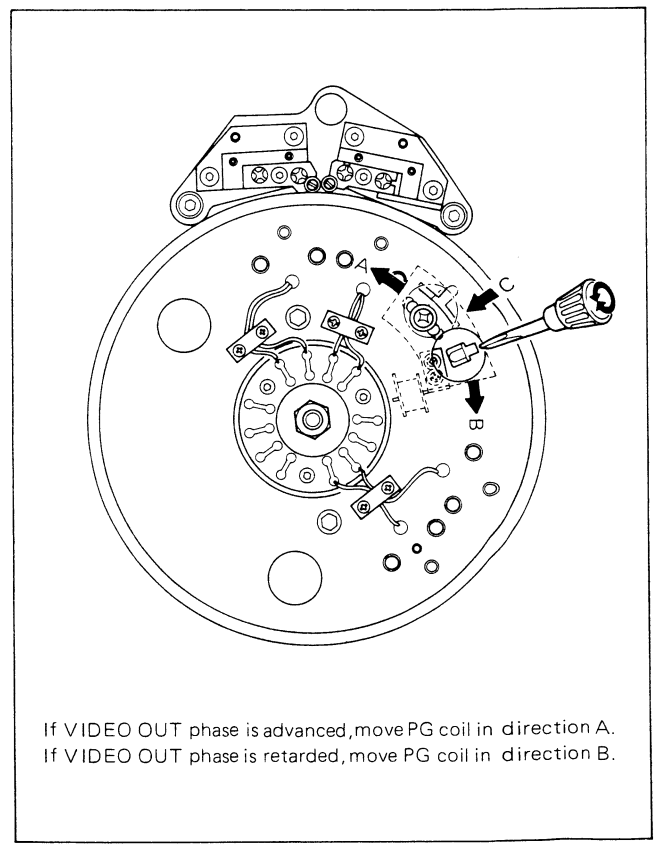
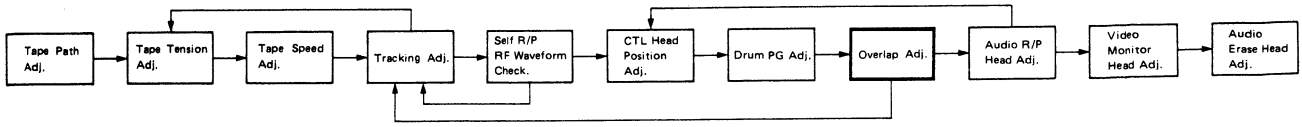


Fig. 9-29. Adjustment of PG coil mounting position



If VIDEO OUT phase is advanced, move PG coil in direction A.
If VIDEO OUT phase is retarded, move PG coil in direction B.



9-9. OVERLAP ADJUSTMENT

* Since this adjustment involves the possibility of damaging the drum and breaking the head tip, it is recommended to be adjusted by a professional engineer.
* It is not necessary to perform this adjustment unless overlap is insufficient for the operation.

Preliminary Explanation

1. An overlap is the portion of the playback RF waveform cut off by PB switching.
2. If the overlap is not acceptable, perform this adjustment.
   (1) To adjust overlap "C" (See Fig. 9-30) on the tape entrance side, set up the condition in which the "S" side slant guide can be turned around screw "M" shown in Fig. 9-31 and adjust the clearance between the "S" side guide bracket and the upper drum.
   (2) To adjusting overlap "D" on the tape exit side, set up the condition in which the "T" side slant guide can be turned around screw "Q" in Fig. 9-31 and adjust the clearance between the "T" side guide post and the upper drum.
   (3) If the overlap must be increased, adjust the overlap adjusting screw shown in Fig. 9-31.

   – NOTE –

   When you want to decrease the overlap, sometimes the overlap adjusting screw is not effective for this purpose. In such a case, perform Step (1) or Step (2).

   (4) If the overlap is umbalanced on to one side or the other ("S" or "T" side), move the whole slant guide assembly clockwise or counterclockwise along the circumference of the drum.
3. If overlaps "B" and "C" are adjusted, it is not necessary to adjust overlap "A" and dropout "D"

— Reference —

The relationship between the overlaps "B" and "D" is expressed as follows.

D = B – 0.5H

– NOTE –

① The CTL head position adjustment and the PG phase adjustment must be finished before the overlap adjustment.

② If the "T" side slant guide or the slant guide assembly has been adjusted, check the CTL head position again and, if necessary, adjust its position again, then adjust the PG position, and check the overlap again.

4. Use the below thickness gauge for this adjustment.

J-8, SONY Part No.: J-604-167-0A

Fig. 9-30. Overlap adjustment

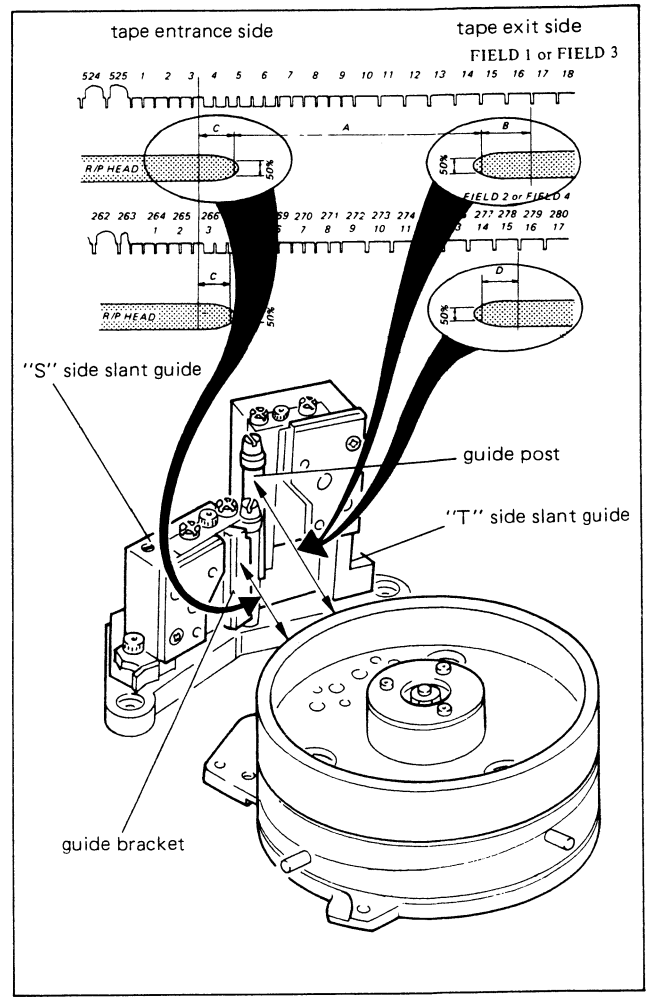
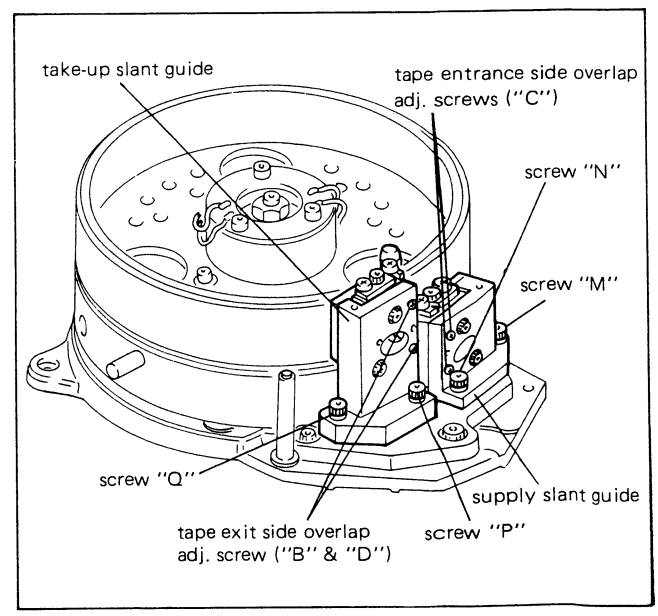
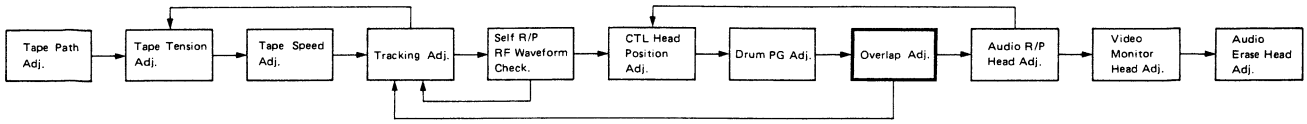


Fig. 9-31. Overlap adjustment





9-9-1. Overlap Check

1. Connect an oscilloscope as follows.
   CH-1: INPUT VIDEO (TP1/MD-9)
   CH-2: TP7/RF-2
   TRIG:TP2/SV-17 (or SV-18)
2. Thread a tape and record a color bar or other video signal.
3. Playback the recorded portion. Take notes of overlap "B" and "C".
4. If the sum of overlap "B" and "C" is within the range shown, below and the overlaps are very unbalanced on the tape exit side or the entrance side, start the adjustment from Item III "Adjustment of Unbalanced Overlap."

   185 ≦ B + C ≦ 250μsec. (for NTSC or PAL-M model)
   255 ≦ B + C ≦ 320μsec. (for PS model)

Fig. 9-32. Overlap check

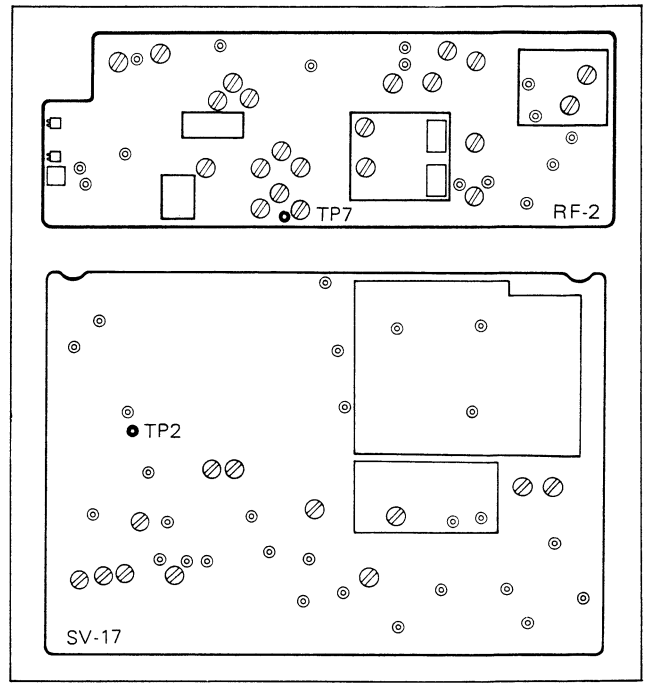
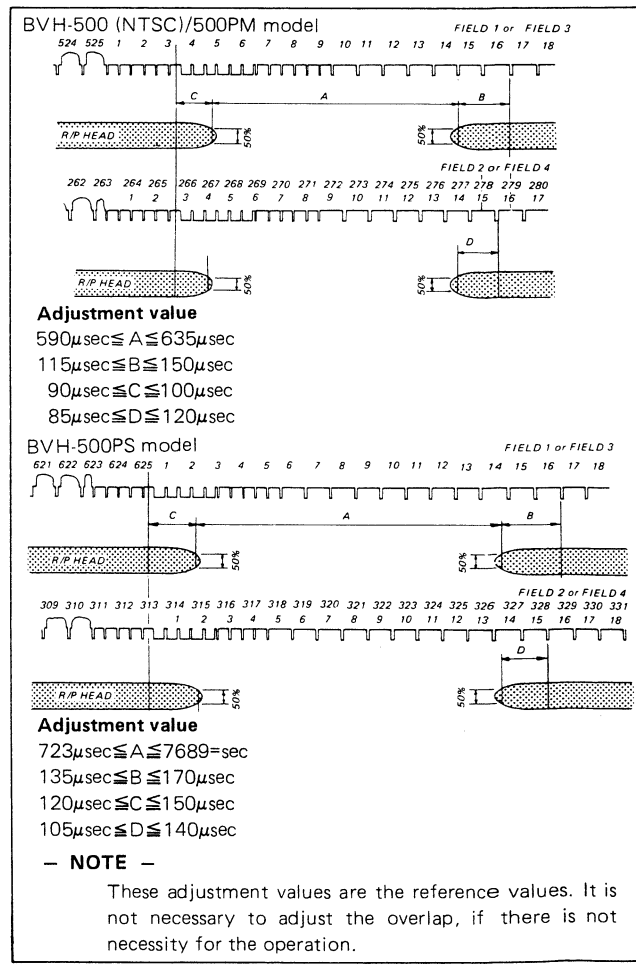
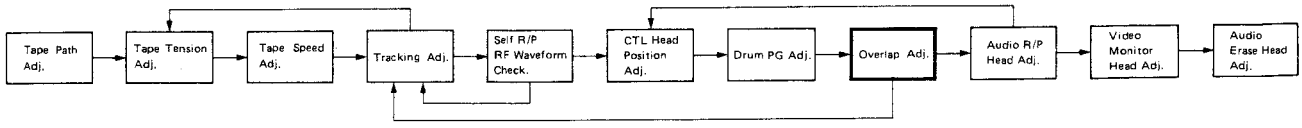


Fig. 9-33. Overlap adjustment value



– NOTE –

These adjustment values are the reference values. It is not necessary to adjust the overlap, if there is not necessity for the operation.



9-9-2. Overlap Adjustment

I. Adjustment of Overlap "C"

— NOTE —

* The clearance between the "S" side guide bracket and the upper drum is adjusted as follows.

Symptom	Clearance
"C" is short.	Narrow.
"C" is long.	Widen.

* If PG clearance is varied 10μm on the tape entrance side, the overlap changes approximately 20μsec.

* If the "S" side guide bracket is extremily apart from the upper drum or close to it, adjust this clearance to 0.1mm refering step 5 to 6 in adjustment procedure before this adjustment.

Adjustment Procedure

1. Turn the upper drum by hand and stop it at the position where the rotary heads are away from the slant guide.
2. Measure the clearance "a" (mm) between the upper drum and the "S" side slant guide bracket with a thickness gauge.

— CAUTION —

Be careful not to damage the upper drum when inserting the thickness gauge into the clearance.

3. Calculate the thickness "b" (mm) of the thickness gauge to be used for the adjustment with the following formula.

(for NTSC & PM models) $b = a + \frac{C - 85}{2000}$

(for PS model) $b = a + \frac{C - 135}{2000}$

where C is the overlap measured in the check.

For example, if the clearance "a" between the upper drum and "S" side slant guide is 0.1mm and
C = 105μsec, then
$b = 0.1 + \frac{105 - 85}{2000} = 0.11$ for NTSC & PM model
The thickness of the gauge required is 0.11mm.

4. Loosen screw "M" shown in Fig. 9-34 1/2 turn.

— NOTE —

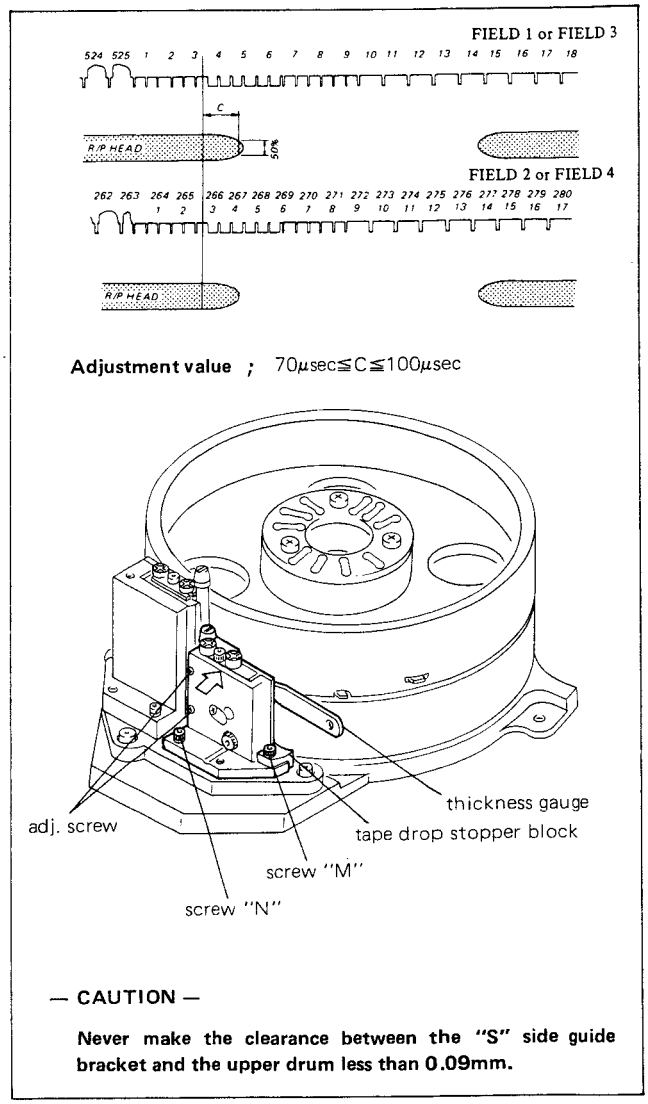
Do not loosen too much, or the "S" side slant guide will move and all adjustments from including the tracking adjustment must be made again.

5. Loosen the screw "N" 1 to $1\frac{1}{2}$ turns.
6. Insert a thickness gauge of thickness "b", calculated in Step 3, into the clearance between the "S" side guide bracket and the upper drum. Tighten the screws "M" and "N" while pushing the upper section of the "S" side slant guide lightly toward the drum. Check that the clearance is the one required by pulling out and inserting the thickness gauge again into the clearance.
7. Check the overlap "C", following the check procedure.
8. If further adjustment is required, set up the STOP mode and turn the two adjusting screws of the "S" side slant guide slightly (approx. 10 degrees) in the same direction.
9. Repeat Steps 7 and 8 until the required clearance is obtained.

— CAUTION —

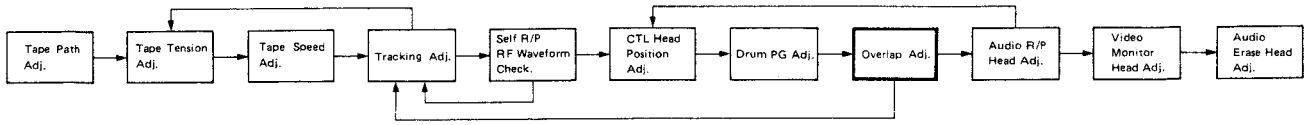
Never make the clearance between the "S" side guide bracket and the upper drum less then 0.09mm.

Fig. 9-34. Adjustment of overlap "C"



— CAUTION —

Never make the clearance between the "S" side guide bracket and the upper drum less than 0.09mm.



II. Adjustment of Overlap "B" or "D"

– NOTE –

* The clearance between the "T" side slant guide post and the upper drum is adjusted as follows, depending on the symptom.

Symptom	Clearance
"B" or "D" is short.	Narrow.
"B" or "D" is long.	Widen.

* If the clearance is changed 10μm on the tape exit side, the overlap changes approximately 4μsec.

* If either overlap "B" or "D" is adjusted, it is not necessary to adjust the other.

* If the "S" side slant guide bracket is extremily apart from the upper drum or close to it, adjust this clearance to 0.1mm refering step 5 to 6 in adjustment procedure before this adjustment.

Adjustment Procedure

1. Turn the upper drum by hand and stop it at the position where the rotary heads are away from the slant guide.
2. Measure clearance "d" (mm) between the upper drum and the "T" side guide post with a thickness gauge.

– CAUTION –

Be careful not to damage the upper drum when inserting the thickness gauge into the clearance.

3. Calculate the thickness "e" (mm) of the thickness gauge to be used for the adjustment with the following formula.

NTSC & PM model) $e = d + \frac{B - 132}{400}$

(PS model) $e = d + \frac{B - 152}{400}$

where B is the overlap measured in the check.

For example, if the clearance "d" between the upper drum and "T" side guide post is 0.3 and
B = 172 sec, then
$e = 0.3 + \frac{172 - 132}{400} = 0.4$ (for NTSC & PM model)
The thickness of the gauge required is 0.4mm.

4. Loosen screw "Q" shown in Fig. 9-35 1/2 turn.

– CAUTION –

Do not loosen the screw too much, or the "T" side slant guide assembly will move and all adjustments from including the tracking adjustment must be made again.

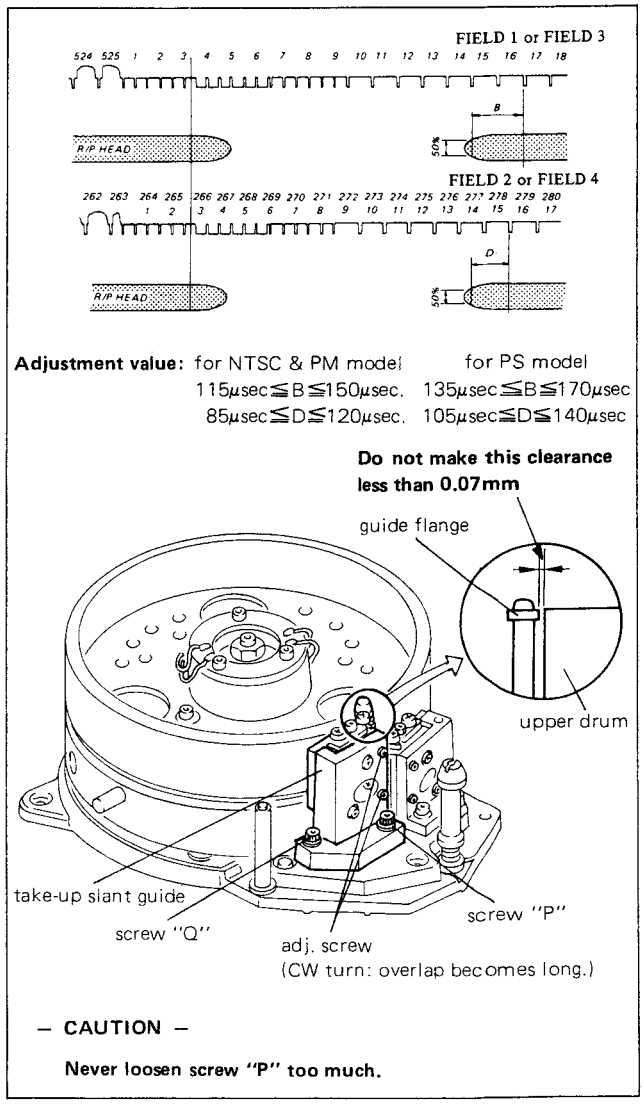
5. Loosen the screw "D" 1 to $1\frac{1}{2}$ turns.
6. Insert a thickness gauge of thickness "e", calculated in Step 3, into the clearance between the "T" side guide bracket and the upper drum. Tighten the screw "P" and "Q" while pushing the upper section of the "T" side slant guide lightly toward the drum. Check that the clearance is the one required by pulling out and inserting the thickness gauge.
7. Check overlaps "B" and "D", following the check procedure.
8. If further adjustment is requried, set up the STOP mode and turn the two adjusting screws of the "T" side slant guide slightly (approx. 10 degrees) in the same direction.
9. Repeat Steps 7 and 8 until the required clearance is obtained.

– CAUTION –

Never make the clearance between the "T" side slant guide and the upper drum less than 0.07mm.

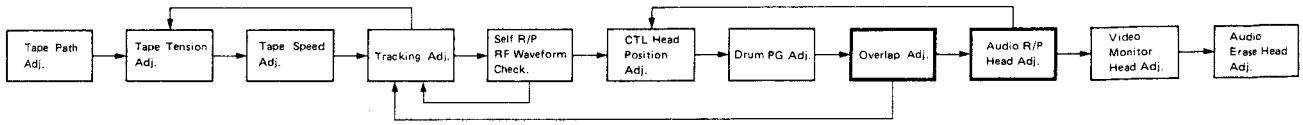
10. If the "T" side slant guide has been moved, adjust the CTL position and the PG phase, and then recheck the overlap.

Fig. 9-35. Adjustment of overlaps "B" and "D"



– CAUTION –

Never loosen screw "P" too much.



III. Adjustment of Unbalanced Overlap

Adjustment Procedure

1. Calculate the thickness (f mm) of the thickness gauge to be used for the adjustment with the below formula after verifying that the overlap is unbalanced on one side.

   (NTSC & PM model) f = 0.025 (0.6C – 0.4B)
   (PS modeL0 f = 0.025 (0.3C – 0.47B),
   where B and C are the overlaps measured in the check procedure.

   – NOTE –

   Move the slant guide assembly in the following direction, depending on the sign of f.

   (1) f > 0: in the direction of arrow "X"
   (2) f < 0: in the direction of arrow "Y"

2. Move the slant guide assembly, following this procedure:

   (1) If f > 0, move the assembly in the direction of arrow "X".
   ① Loosen the three screws marked by asterisk ★ which secure the slant guide.
   ② Place a thickness gauge of "f" mm (f is calculated in Step 1) between the stopper and the slant guide assembly. With the thickness gauge inserted, tighten the three screws while pushing the slant guide toward the stopper and the lower drum simultaneously.
   ③ Remove the thickness gauge. Loosen the stopper by loosening the support. Turn the stopper clockwise (↻) until it touches the slant guide base. Then fix the stopper by tightening the support.

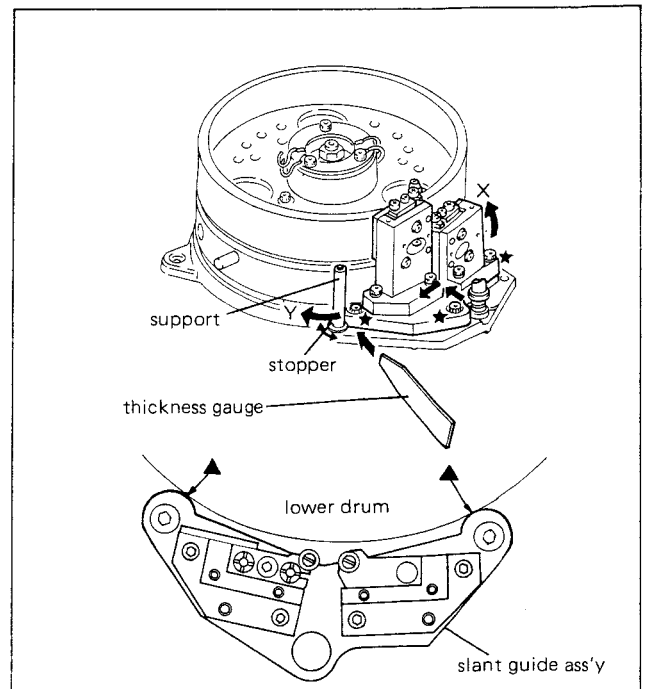
   (2) If f < 0, move the slant guide assembly in the direction of arrow "Y".
   ① Loosen the support shown in Fig. 9-36 1/2 turn. Turn the stopper counterclockwise (↺) and place a thickness gauge of "f" mm (f is calculated in Step 1) between the stopper and the slant guide. Turn the stopper clockwise (↻) until it touches the thickness gauge. Tighten the support.
   ② Loosen the three screws (marked by ★) securing the slant guide assembly. Remove the thickness gauge. Tighten the three screws while pushing the slant guide assembly toward the stopper and the lower drum simultaneously, as shown by the arrows in Fig. 9-36.

3. Check that a 0.03mm thickness gauge cannot be inserted into the sections shown by black triangles (▲) in the lower part of figure Fig. 9-36.

4. Check overlaps "B", "C", and "D", according to the check procedure.

5. If the slant guide assembly has been moved, adjust the CTL head position and the PG phase and recheck the overlap.

Fig. 9-36. Adjustment of unbalanced overlap



– NOTE –

The 0.03mm thickness gauge should not be inserted into the sections marked by ▲.

9-10. AUDIO R/P HEAD ADJUSTMENT

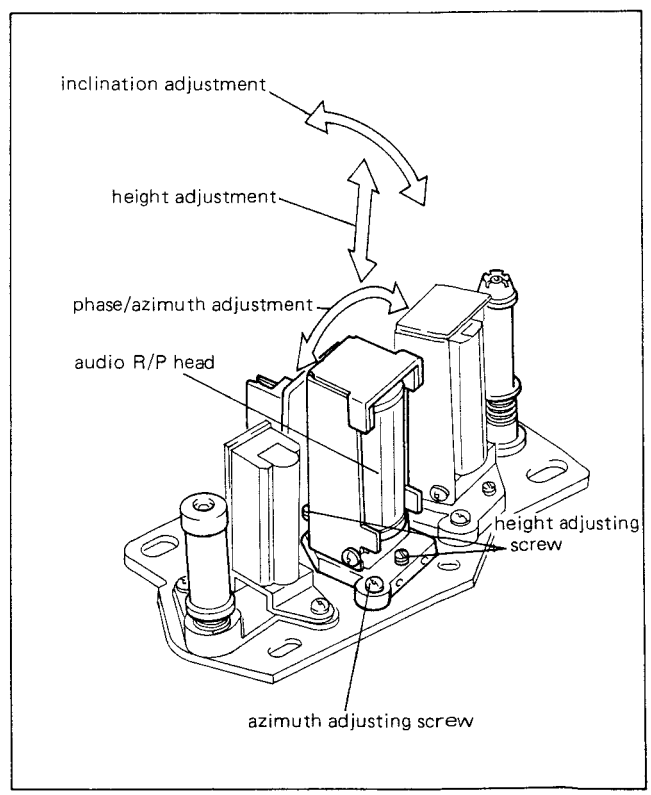
Preliminary Explanation

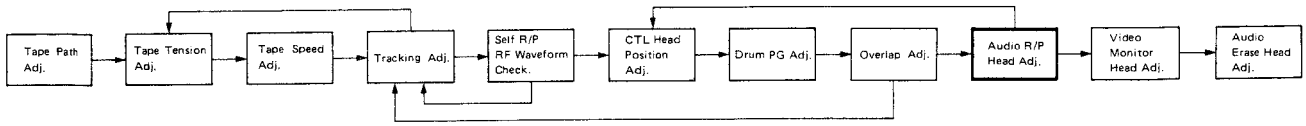
1. This adjustment comprises the inclination adjustment, the height adjustment, and the phase/azimuth adjustment of the audio R/P head.

   – NOTE –

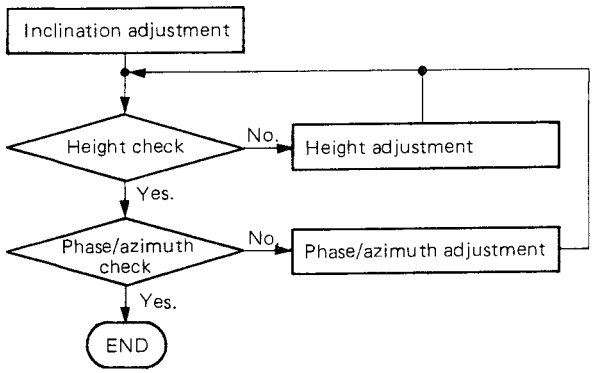
   If the audio R/P head is replaced, it is necessary to check the 15 kHz level variation also.

Fig. 9-37. Audio R/P head adjustment





2. Perform the adjustment, following the flow chart below.



3. The audio R/P head adjustment is also necessary in the following cases.

   (1) When the audio R/P head is replaced.

   (2) When the height of the guide roller or the fixed guide shown in Fig. 9-38 is changed.

4. Remove the audio shield plate before this adjustment. See Fig. 9-38.

5. This jig (flat plate) is necessary for this adjustment:

   J-2 SONY Part No. J-604-016-0A

Adjustment Procedure

Inclination Adjustment

1. Put the jig (the flat plate) on the video monitor head and the audio R/P head as shown in Fig. 9-38. Check that there is no clearance between the audio R/P head and the flat plate when the plate is put on the video monitor head without any clearance.

2. If there is a clearance, adjust the height of the audio R/P head by turning one of the two height adjusting screws counterclockwise (↺). See Fig. 9-38.

Height Check

3. Connect an oscilloscope to the playback adapter connector.
   CH-1: pin 1 (HOT), pin 2 (GND)
   CH-2: pin 16 (HOT), pin 17 (GND)

4. Thread an alignment tape and play back the audio 3 kHz segment. Increase the gain of the oscilloscope so that the level of both channels are equal and observe "G" shown in Fig. 9-39.

5. Check that "G" on the oscilloscope screen becomes greater when the tape edge near the audio R/P head is pushed down or up by your finger.

   - If "G" becomes narrow, adjust the head height. (Perform Step 6.)
   - If "G" becomes wide, the head height adjustment is not necessary. Check the phase by performing Step 9.

Fig. 9-38. Inclination adjustment of audio R/P head

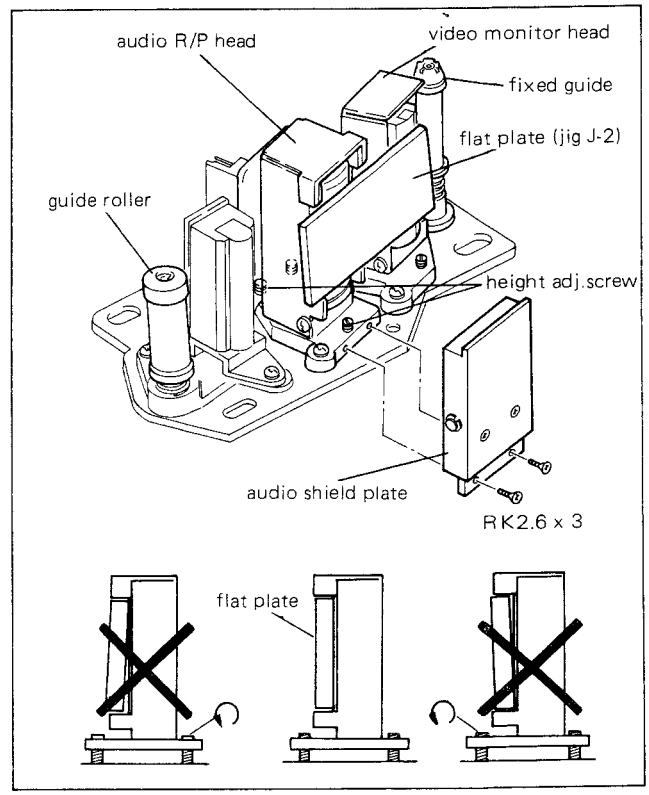
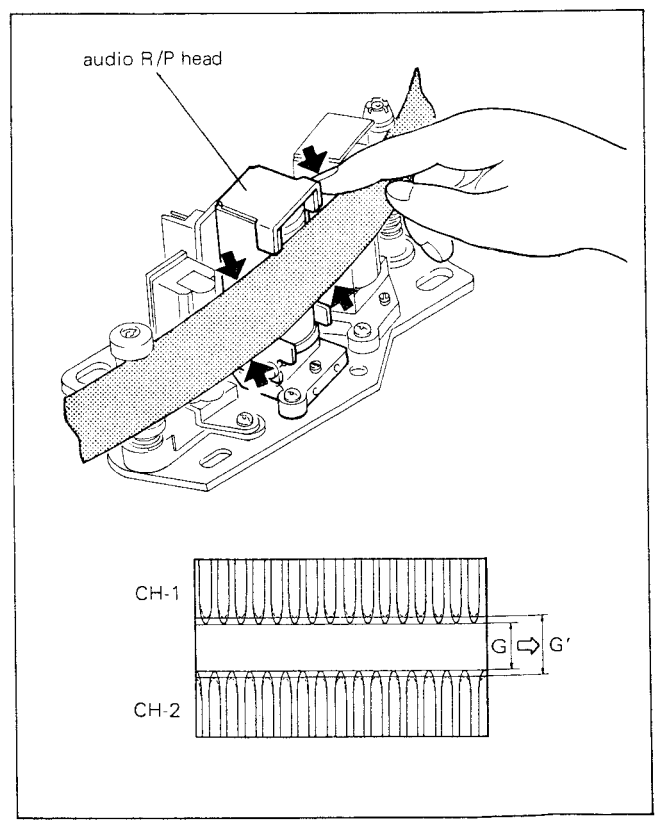
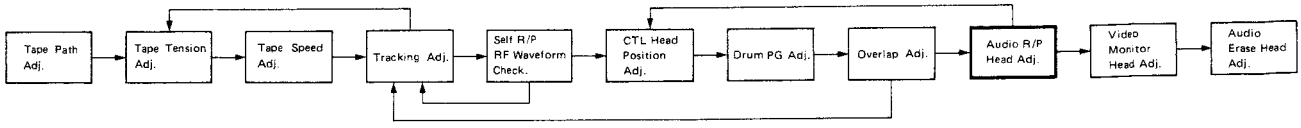


Fig. 9-39. Height check of audio R/P head





Height Adjustment

6. Check that "G" becomes narrow when the tape is pushed down or when the tape is pushed up.

   ① If "G" becomes narrow when the tape is pushed down, Raise the head by loosening the two azimuth adjusting screws shown in Fig. 9-40 equally and turning the two height adjusting screws clockwise equally.

   – NOTE –

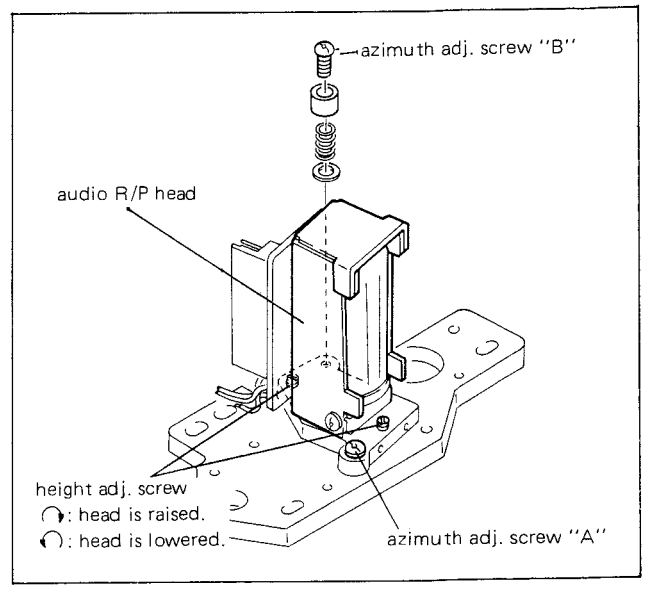
   If the turning of the height adjusting screw becomes stiff, slightly loosen the two azimuth adjusting screws an equal amount.

   ② If "G" becomes narrow when the tape is pushed up, lower the head by turning the two height adjusting screws an equal amount counterclockwise.

   – NOTE –

   If the two height adjusting screw are not turned an equal amount in the same direction, the inclination of the head changes.

Fig. 9-40. Height adjustment of audio R/P head



7. Check to see that the audio R/P head is parallel with the audio erase head. If it is not parallel, adjust the azimuth adjusting screw.

   – NOTE –

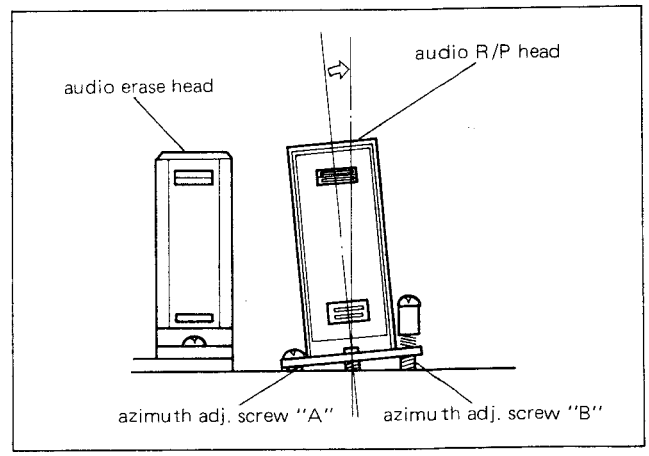
   Because the azimuth changes as the adjusting screws are turned, turn the screws as follows.

   ① If the audio R/P head is slanted toward the audio erase head;
   ⟶Turn azimuth adjusting screw "A" counterclockwise (↺).
   ⟶Turn azimuth adjusting screw "B" clockwise (↻).

   ② If the audio R/P head is slanted away from the audio erase head;
   ⟶Turn azimuth adjusting screw "B" counterclockwise (↺).
   ⟶Turn azimuth adjusting screw "A" clockwise (↻).

8. Repeat Steps 3 to 5. Check that the required height is obtained. If it is not, repeat Steps 6 and 7 until the required height is obtained.

Fig. 9-41. Visual parallel adjustment of audio R/P head



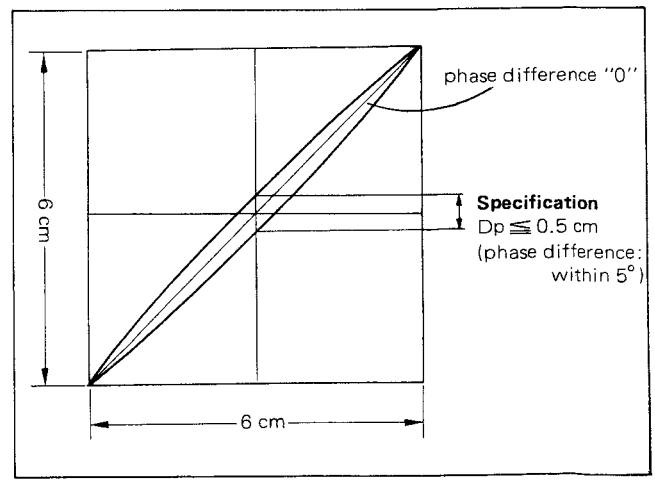
Check and Adjustment of Phase/Azimuth

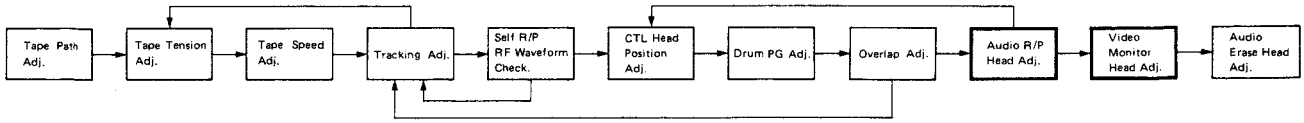
9. Set the oscilloscope to the EXT. HORIZONTAL mode so that the Lissajous' figures of the CH-1 (pin 1 of CN-103) and the CH-2 (pin 16 of CN-103) can be seen on the scope.

10. Play back the audio 3 kHz portion of the alignment tape. Adjust the scope so that the CH-1 level is equal to the CH-2 level.

11. Check that the phase difference between the audio CH-1 and the audio CH-2 is within 5 degrees. See the Lissajous' figure in Fig. 9-42. Play back the audio 15 kHz segment of the alignment tape and check that the phase difference is within 30 degrees as shown in Fig. 9-43.

Fig. 9-42. Phase specification of audio 3 kHz playback





12. Play back the 3 kHz segment. Loosen azimuth adjusting screw "B" shown in Fig. 9-41 and adjust screw "A" so that the specification in Fig. 9-42 is satisfied. Tighten screws "A" and "B" alternately. The specification must be satisfied when screws "A" and "B" are tightened securely. Play back the 3 kHz segment and check that the Lissajous' figure meets the specification. If it does not, perform the visual check shown in Fig. 9-41 and readjust the phase of 3 kHz.

   — **NOTE** —

   Ideally, adjust so that the phase difference at the 3 kHz playback is zero.

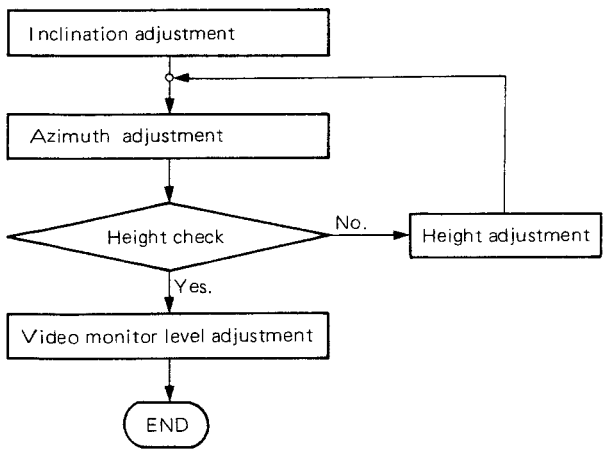
13. Repeat Steps 3 to 5 and check that the height of the audio R/P head satisfies the specification. If it does not, readjust the height, according to Step 6. Check the phase difference again and, if necessary, readjust the phase.

14. Attach the audio shield plate. See Fig. 9-38.

15. Check the CTL head position and, if necessary, readjust the position. Refer to Section 9-7.

9-11. ADJUSTMENT OF VIDEO MONITOR HEAD

1. Perform this adjustment, following the flow chart.



2. Make a "tool" shown in Fig. 9-45 for checking the height of the video monitor head.

3. This jig (flat plate) is necessary for the inclination adjustment.

   J-2, SONY Part No. J-604-016-0A

Adjustment Procedure

Inclination Adjustment

1. Put the jig (flat plate) on the fixed guide and the video monitor head as shown in Fig. 9-44. Check that there is no clearance between the falt plate and the video monitor head when the plate is put on the fixed guide so that there is no clearance between the plate and the fixed guide.

Fig. 9-43. Phase specification for audio 15 kHz playback

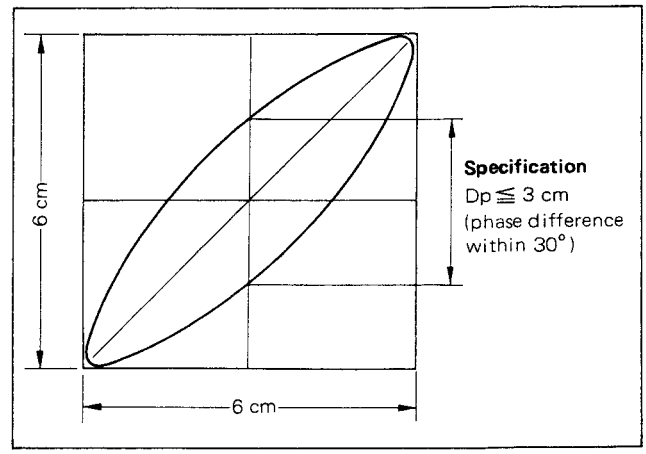


Fig. 9-44. Adjustment of video monitor head

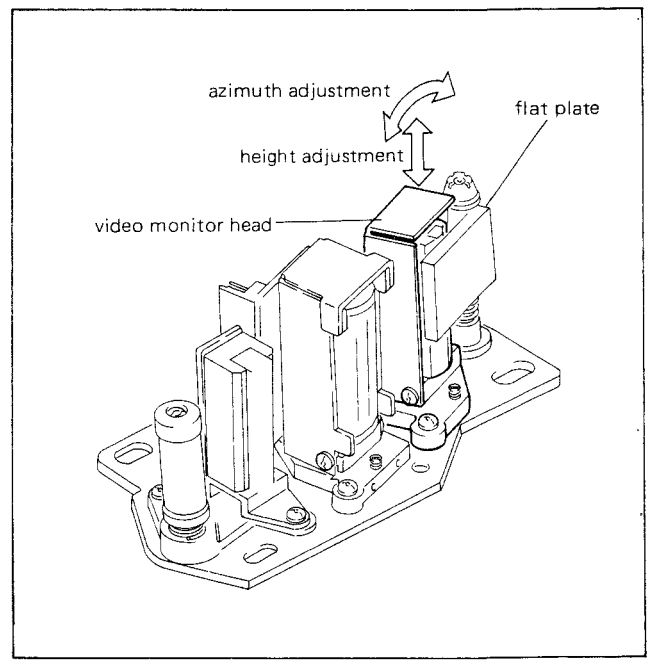
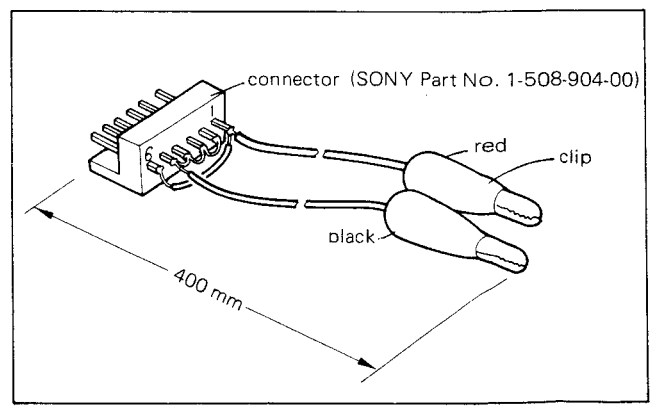
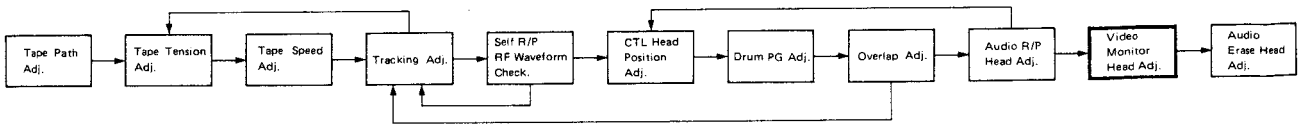


Fig. 9-45. "Tool" for height check





2. If there is a clearance between the plate and the head, turn one of the two height adjusting screws counterclockwise until the head contacts the plate.

Azimuth Adjustment

3. Connect an oscilloscope as follows and set up the CHOP mode.
   CH-1: TP502/AU-10
   CH-2: TP504/AU-10
4. Thread a tape and record a color bar or other video signal.
5. Loosen azimuth adjusting screw "B" shown in Fig. 9-47 and turn azimuth adjusting screw "A" so that the output of the video monitor head is at its maximum. Tighten azimuth adjusting screws "A" and "B" alternately so that this maximum value is maintained. Repeat this tightening procedure until the screws are completely tightened.

Height Adjustment

6. Pull out connector CN84 from the AU-10 board and connect the "tool" made in Item 2 of the preliminary explanation to this removed connector. Connect the red clip to TP30 in the ERASE OSC shield case on the SV-17 (or SV-18) board and the black clip to E-2.
7. Connect an oscilloscope as follows.
   CH-1: VIDEO OUT
   TRIG: TP2/SV-17 (or SV-18)

Fig. 9-46. Azimuth adjustment of video monitor head

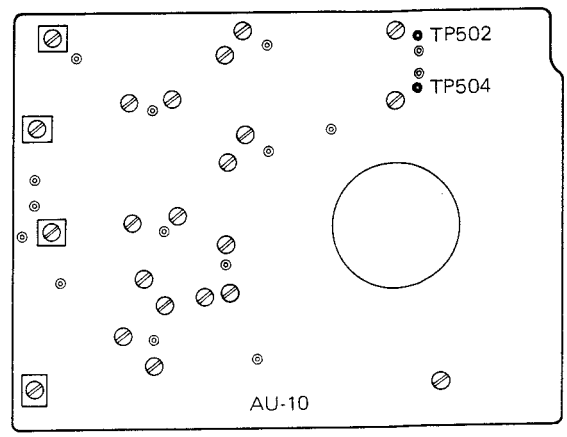


Fig. 9-47. Azimuth adjustment of video monitor head

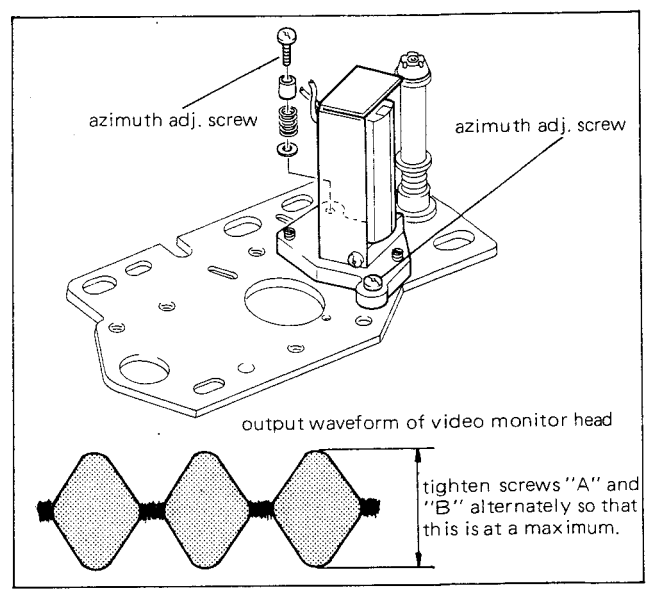
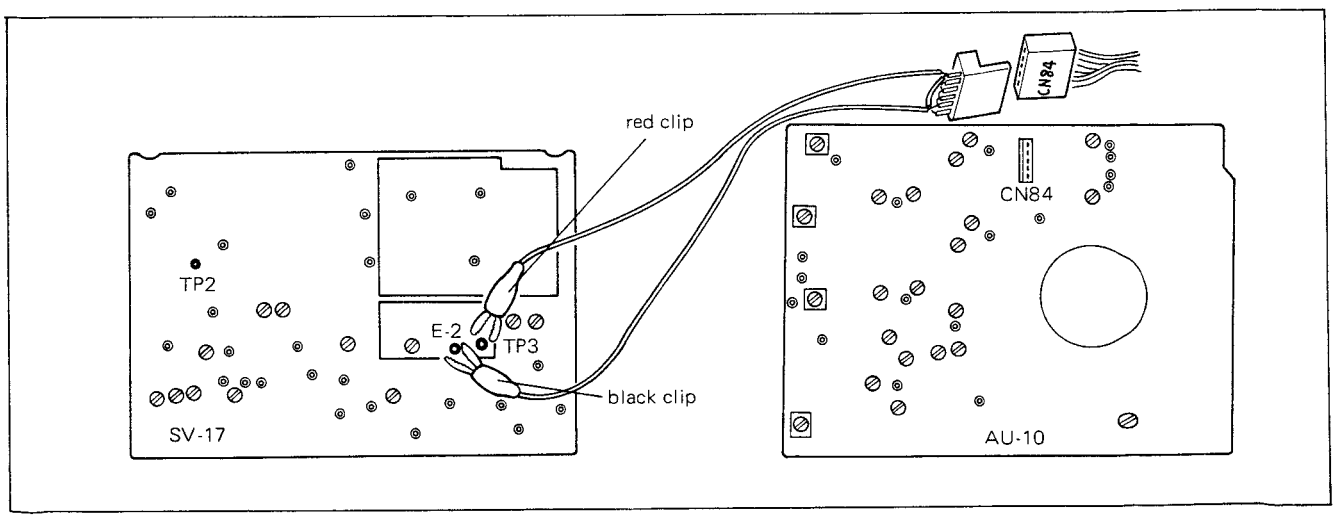
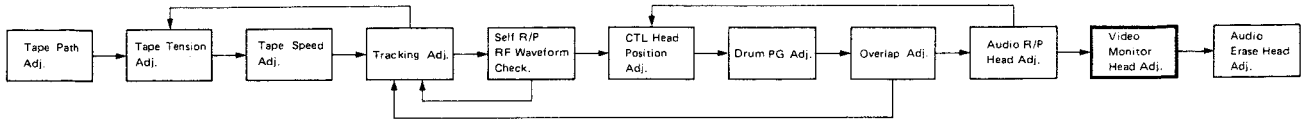


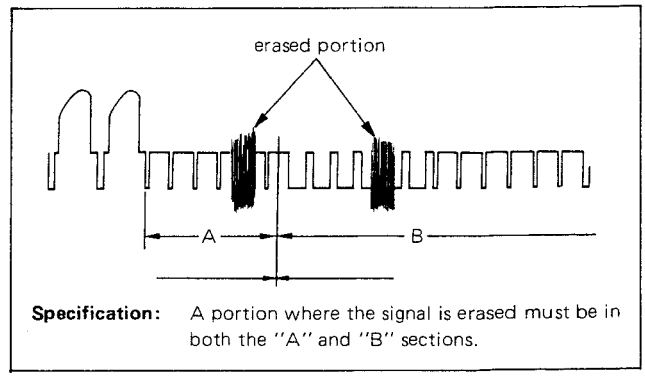
Fig. 9-48. Connection of height adjustment "tool"





8. Record a color bar signal or other video signal. Check that there is a portion in which the signal is erased in each of the "A" and "B" sections of the vertical blanking as shown in Fig. 9-49 when the recorded portion is played back. If this condition is not satisfied, perform the adjustment according to the following procedure.

Fig. 9-49. Specification for height of video monitor head



Specification: A portion where the signal is erased must be in both the "A" and "B" sections.

Height Adjustment

9. Adjust the two height adjusting screws, depending on the position of the erased portions. See Fig. 9-50.

   — **NOTE** —

   ① **The two height adjusting screws must be turned equally in the same direction. If not, the inclination of the head changes.**

   ② **If the turning of the height adjusting screw becomes stiff to turn to raise the head, loosen the azimuth adjusting screws.**

10. Check that the height of the video monitor head satisfies the specification. If it does not, repeat the adjustment until the specified height is obtained.

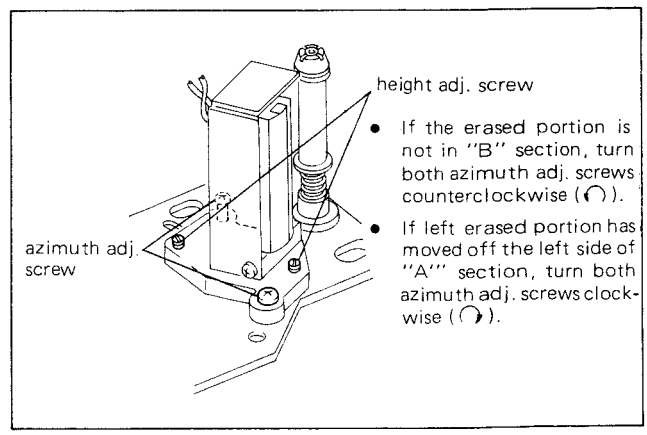
11. Remove the tool connected in Step 5 and connect the CN84.

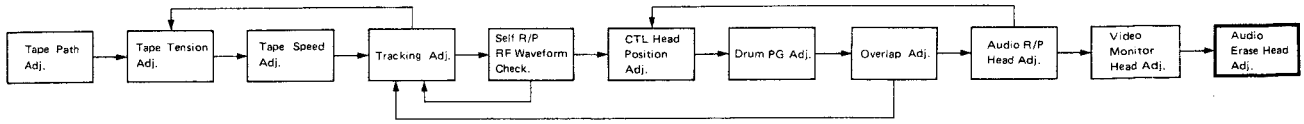
12. Repeat Steps 1 to 4 to readjust the azimuth of the video monitor head.

13. Check the height again. See Step 5.

14. Perform the video monitor level adjustment (section 11-15)

Fig. 9-50. Height adjustment of video monitor head





9-12. ADJUSTMENT OF AUDIO ERASE HEAD

Preliminary Explanation

1. It is not necessary to do this adjustment except in the following special cases, because this adjustment was made at the plant precisely.

   (1) If the audio erase head has been replaced.

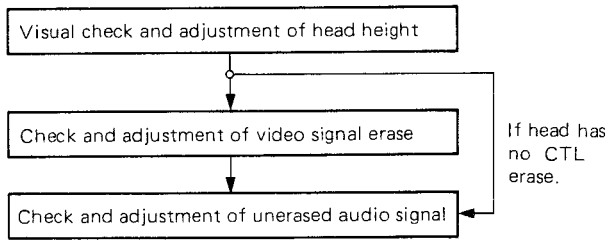
   (2) If the head drum has been replaced and the guide roller and the fixed guide shown in Fig. 9-51 has been moved.

2. If the height of the audio erase head is wrong, the following can happen:

   - A portion of the video signal may be erased.
   - The audio signal may not be completely.

3. The PG phase adjustment (9-8) and the audio R/P head adjustment (9-10) must have been completed prior to this adjustment.

4. This adjustment is done in following sequence.



– NOTE –

(1) The video signal erase check is not necessary for a head without the CTL erase head [SONY Part No. A-6036-013-A (for NTSC & PAL-M model) and No, A-6036-014-A (for PS model)] .

(2) Audio erase head other than the above (SONY Part No. A-6036-013-B) has the CTL erase head. If the height adjustment of this type head is wrong, the beginning of the video track or the final section of the sync track is liable to be erased.

5. Never disassemble or replace a part of the audio erase head supplied as a spare part because the head is the combination of the head and the base and adjusted precisely.

Check and Adjustment Procedure

Visual Check and Adjustment

1. Thread a tape and set up the STOP mode. Turn the take-up and the supply reels by hand to increase tension on the tape.

2. Check that the relationship between the upper edge of the tape and the head core of the erase head, is as shown in Fig. 9-53. If necessary, change the thickness of the spacer.

Fig. 9-51. Adjustment of audio erase head

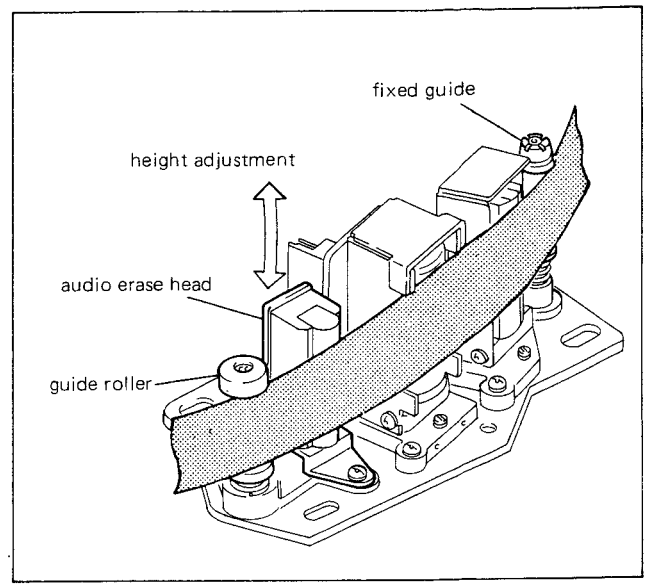
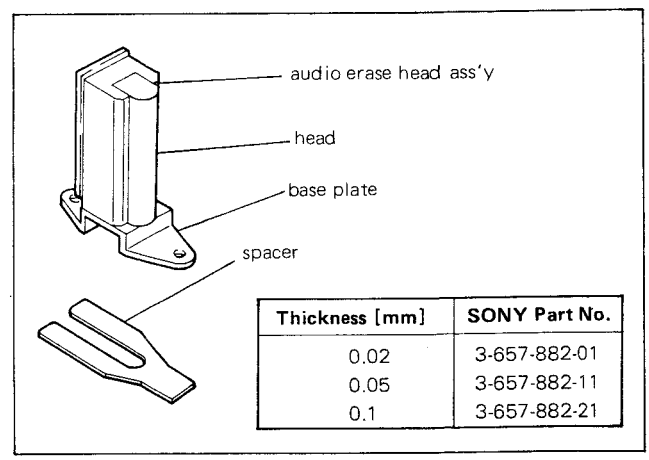
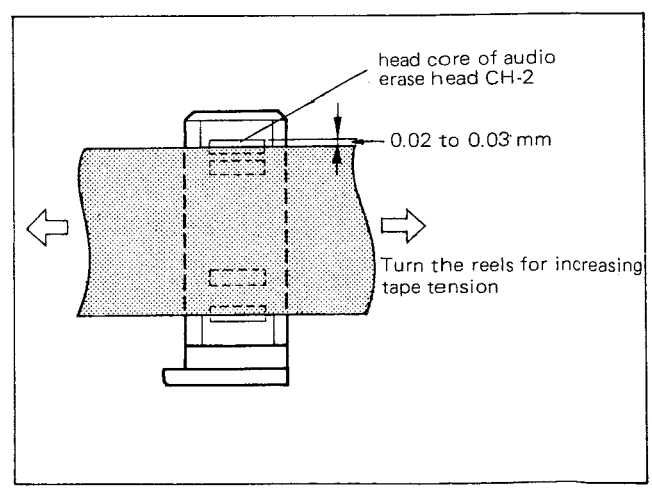


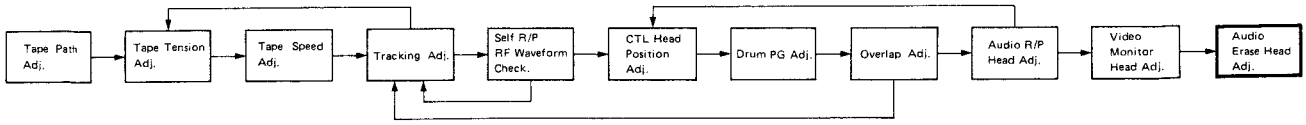
Fig. 9-52. Spare part



Thickness [mm]	SONY Part No.
0.02	3-657-882-01
0.05	3-657-882-11
0.1	3-657-882-21

Fig. 9-53. Visual check





Check of Video Signal Erase

3. Connect an oscilloscope as follows.
   CH-1: TP7/RF-2
   CH-2: TP8/RF-2
   TRIG: TP2/SV-17 (or SV-18)

4. Thread a blank tape, a bulk erased tape, or a no audio signal tape recorded on the machine with a full erase head such as a BVH-1100. Record a color bar signal or other video signal. Remember the tape time when the recording is finished.

5. Play back the final section of the recording. If the beginning of the video RF waveform or the final section of the sync RF waveform changes as shown in Fig. 9-54 just before the end of the record, adjust as follows:

   (1) If the beginning of the video RF waveform changes, lower the head.

   (2) If the end of the sync RF waveform changes, raise the head.

Check of Unerased Audio Signal

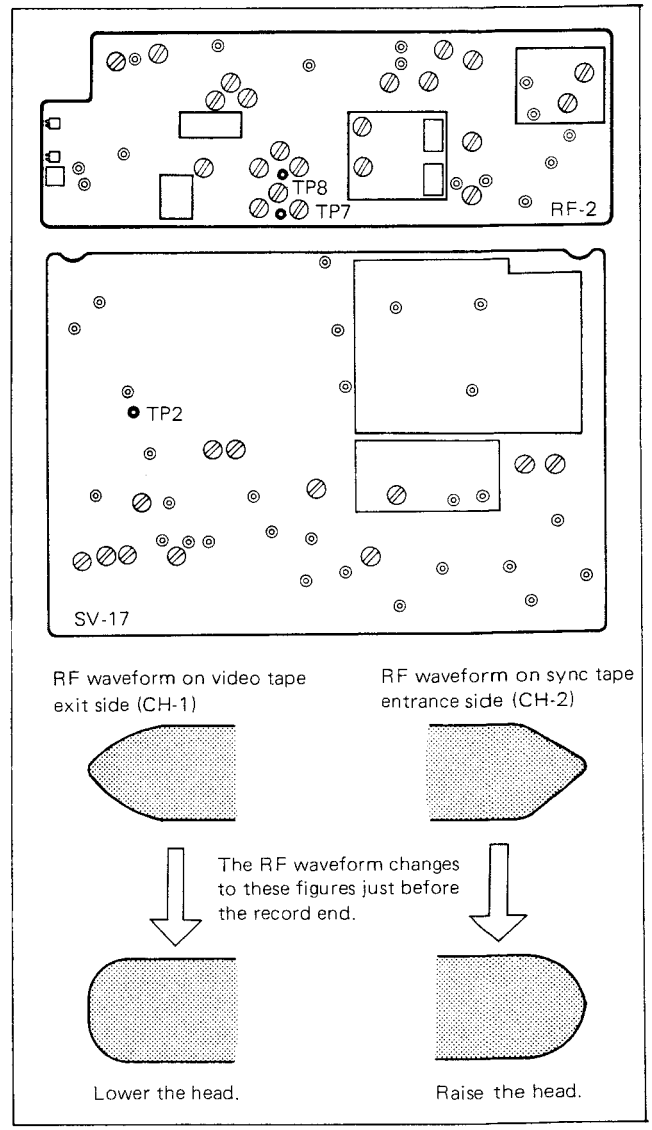
6. Thread the same tape used in Step 4. Set the timer to "0" and record the 1 kHz signal on the audio channel.

7. Rewind the tape until the timer indicates "0" and make a recording of the no audio signal.

8. Rewind the tape again until the timer indicates "0". Connect the headphone, play back the record, and set the volume control knob to maximum. Check that the 1 kHz signal cannot be heard.

9. If the signal is heard, change the thickness of the spacer then repeat step 6 to 8.

Fig. 9-54. Check of video signal erase



SECTION 12
POWER SUPPLY AND SERVO SYSTEM ALIGNMENT

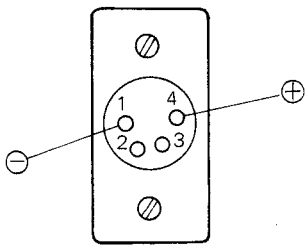
12-1. EQUIPMENT REQUIRED

1. DC Power Supply (10 ~ 13 V)
2. Digital Voltmeter
3. Frequency Counter
4. Tentelmeter
5. Oscilloscope

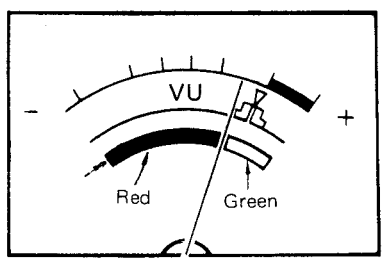
12-2. BATTERY ALARM LAMP (LIGHT-UP/BLINK) ADJUSTMENT

VTR MODE : RECORD
EQUIPMENT : DC power supply
Digital Voltmeter

1. Connect dc power supply to DC IN connector as shown below.



2. Connect digital voltmeter between TP-24 and TPE-3 on the SV board.
3. Set dc power supply output voltage to 10.79 Vdc.
4. ◐ R169/SV17: BATTERY ALARM LAMP = LIGHT
5. Set the METER/PHONE selector to BATTERY position. Adjust R15 on the DP-7 board to obtain the meter needle indicate at the center between red and green zones.



6. Set dc power supply output voltage to 10.99 Vdc.
7. ◐ R119/SV-17: BATTERY ALARM LAMP = BLINK

12-3. 2 Vdc REFERENCE VOLTAGE ADJUSTMENT

VTR MODE : STANDBY
EQUIPMENT : Digital Voltmeter (DVM)

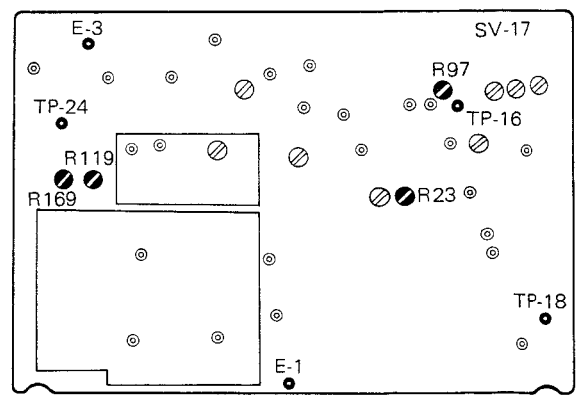
1. Connect DVM between TP-16 (+), and TPE-1 (–) on the SV-17 board.
2. ◐ R97/SV17: 2.00 ± 0.01 Vdc

12-4. DRUM DUTY ADJUSTMENT

VTR MODE : STANDBY
EQUIPMENT : Oscilloscope

1. Set SW1-1 on the SV-17 board to ON.
2. Connect scope between TP-18 and TPE-1 o the SV-17 board.
3. Set scope "HORIZ DISPLAY" to "A INTEN BY B" then superimpose a high light portion upon the trailing edge by using DELAY control as shown below.

4. Set scope "HORIZ DISPLAY" to "B".
5. Adjust R23 on the SV-17 board to obtain in phase at the leading edge and trailing edge when switch the polarity of "A TRIGGERING +/–".



12-5. DRUM POWER ADJUSTMENT

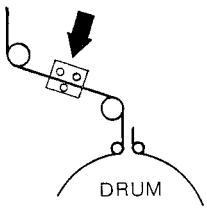
VTR MODE : STOP
EQUIPMENT : Digital Voltmeter (DVM)

● R166/SV-17: TP-29 (+) } 18.0 ± 0.5 Vdc
TPE-1 (–) }

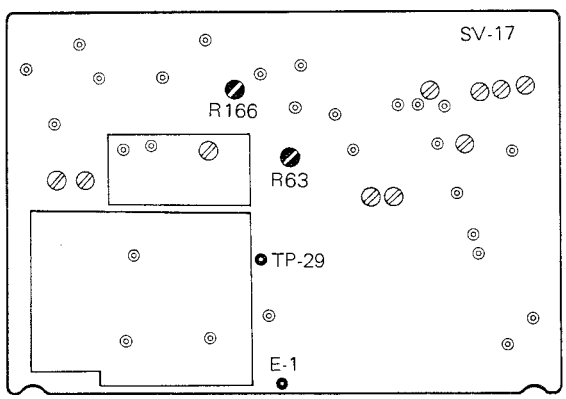
12-6. REEL TENSION VOLTAGE ADJUSTMENT

VTR MODE : RECORD
EQUIPMENT : TENTELOMETER(TYPE T2-H12-2)

1. Measure reel tension with the Tentelmeter placed between the tape guide and guide roller as shown below.



2. Adjust R63 on the SV-17 board for a reel tension reading of 90 ± 5 grams.
   - Measure reel tension at the tape biginning, center and ending positions.



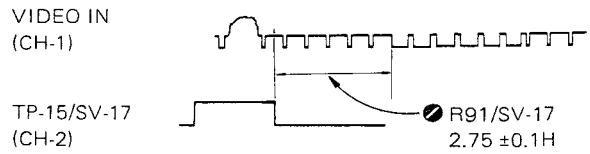
12-7. TAPE SPEED ADJUSTMENT

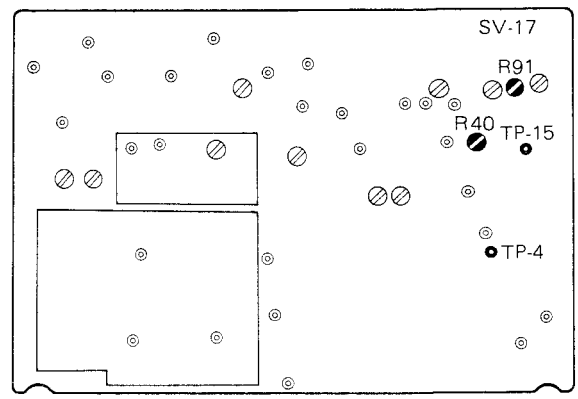
VTR MODE : RECORD ←→ PLAY
EQUIPMENT : Frequency Counter

1. Connect frequency counter between TP-4 and GND on the SV-17 board.
2. ● R40/SV-17: 1147.3 ± 0.3 Hz
3. Play it back then confirm frequency reading.

12-8. DRUM PG LOCK ADJUSTMENT

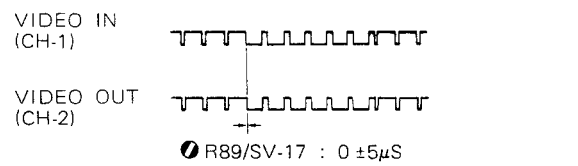
VTR MODE : RECORD
EQUIPMENT : Oscilloscope
SIGNAL SOURCE : COLOR BARS
CAMERA/LINE select : LINE position

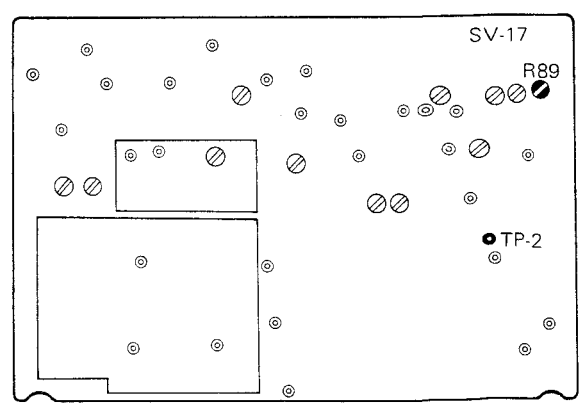




12-9. DRUM PG PHASE ADJUSTMENT

VTR MODE : PLAY (use Alignment Tape)
EQUIPMENT : Oscilloscope: TRIG, EXT from TP-2/SV-17
Alignment Tape: BR5-2
SIGNAL SOURCE : COLOR BARS
CAMERA/LINE select : LINE position

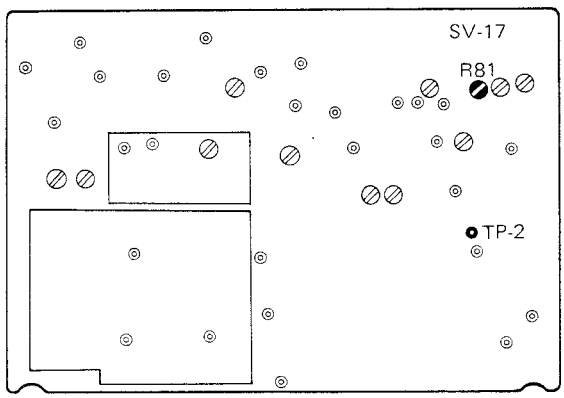




12-10. DRUM PG ADVANCE ADJUSTMENT

VTR MODE : PLAY (use Alignment Tape)
EQUIPMENT : Oscilloscope: TRIG, EXT from TP-2/SV-17
SIGNAL SOURCE : COLOR BARS
CAMERA/LINE select : LINE position

1. Connect channel-1 of scope to VIDEO IN and channel-2 to VIDEO OUT.
2. Short between pin-14 of ADAPTOR connector (CN103) and ground.
3. Adjust video output phase to obtain 4H early than video in by R81 on the SV-17 board.



SONY

PORTABLE VIDEOCORDER

BVH-500
BVH-500PS
BVH-500PM

SUPPLEMENT-4

PERIODIC CHECKS AND MAINTENANE

PARTS REPLACEMENT AND ADJUSTMENT

Please file this supplement on your first or second edition manual.

OPERATION AND MAINTENANCE MANUAL

9-966-461-84

Sony Corporation

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SECTION 4
PERIODIC CHECKS AND MAINTENANCE

4-1. MAINTENANCE CHECK ITEM AND PERIOD

Period	Item	Reference Section
Every day	• Cleaning	4-2
	• Head degaussing	4-3
	• Record current check	4-4
	• Operation function check	4-5
250 hours	• Tracking check	4-6
500 hours	• Head tip projection check (Upper drum replacement)	4-7 (8-1)
	• Tape tension check	9-3
When required.	• Shaft grounding ass'y maintenance	4-8

4-2. CLEANING

A. Daily Cleaning

- Magnetic powder from the tape on the heads and other surfaces over which the tape runs will deteriorate picture quality. Clean all the surfaces indicated by the heavy line in Fig. 4-1 with a piece of chamois moistened with a cleaning fluid like Freon before threading the tape with the power off.
- Press the moistened chamois lightly to the rotary head and turn the drum manually slowly back and forth.

– CAUTION –

(1) Do not run the motor to rotate the drum while cleaning.

(2) Do not move the chamois vertically along the head tip. The head tip will be damaged unless the chamois is moved only horizontally along the head tip.

(3) Wipe the head carefully with a dry chamois after cleaning.

(4) Thread the tape only after the cleaning fluid has dried up. If the tape is threaded without waiting for the fluid to dry, the tape will stick to the drum. Sometimes the drum cannot rotate.

Fig. 4-1. Surfaces to be cleaned daily

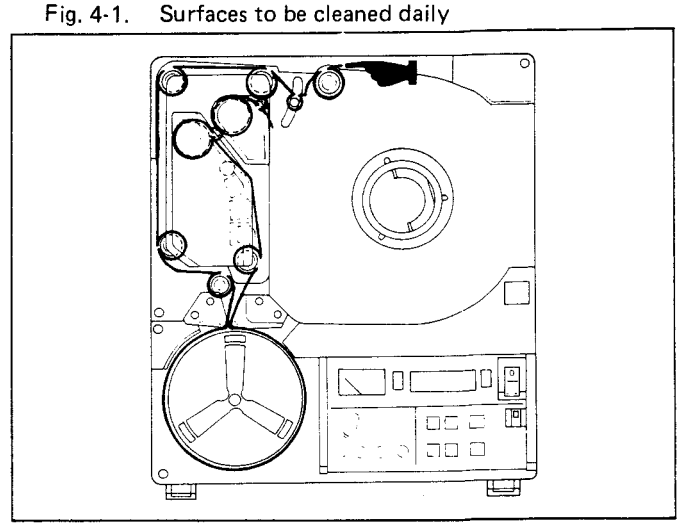
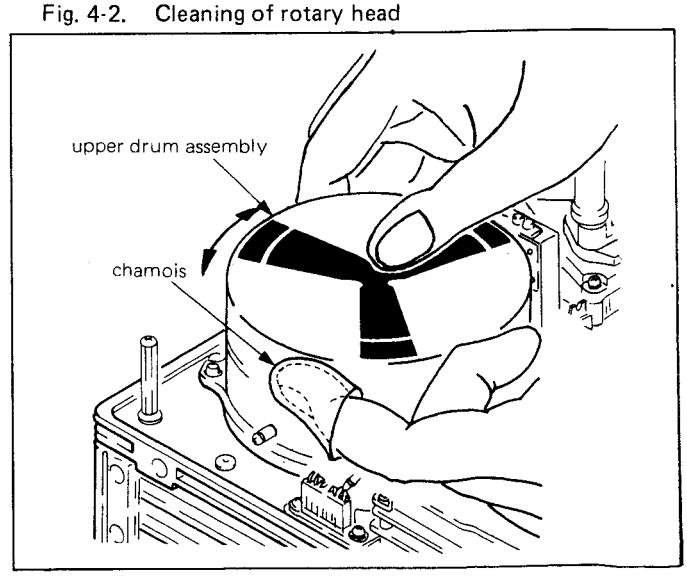


Fig. 4-2. Cleaning of rotary head



B. Cleaning to be done every other week or every 100 operating hours

(1) Cleaning with cleaning paper

① Moisten the cleaning paper with a little cleaning fluid, and let the fluid soak in for two or three minutes. Insert the paper into the clearance between the S side slant guide and the upper drum as shown in Fig. 4-3. Move the paper back and forth in the direction of the arrows, clean the inside of the slant guide.

② Clean the T side slant guide in the same manner.

– NOTE –

If cleaning paper is not available, clean the slant guides with cotton swab whose tip has been flatten.

(2) Cleaning with compressed air

- Use compressed air only after cleaning with cleaning paper as above.

① Use dry compressed air under 3 to 4 kg/cm^2 pressure.

② Position the upper drum as shown in Fig. 4-4 to prevent damage to the head. Blow dust off the inside by directing air between the S and the T side slant guides.

③ Shine a light from above and check to see around the sides of both slant guides that there is no dust, such as the tape powder.

Fig. 4-3. Cleaning with cleaning paper

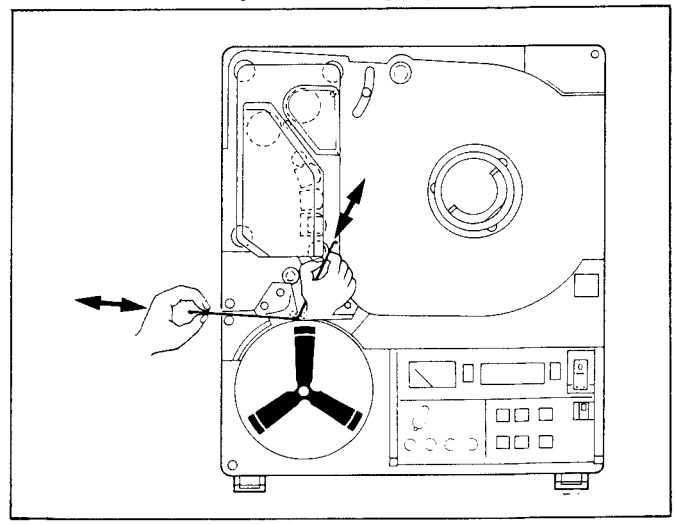
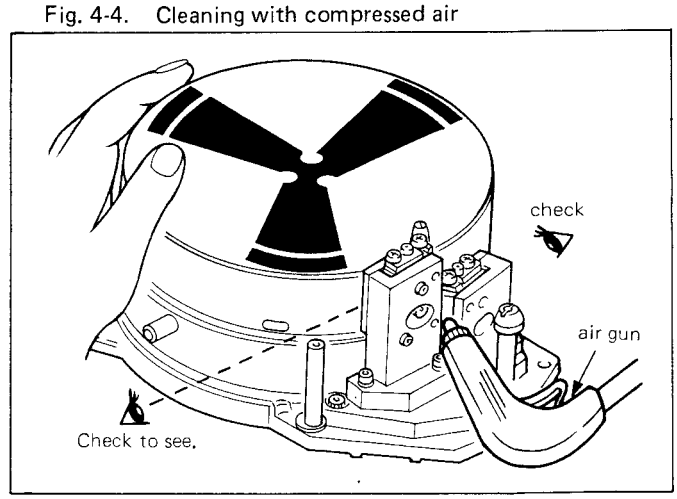


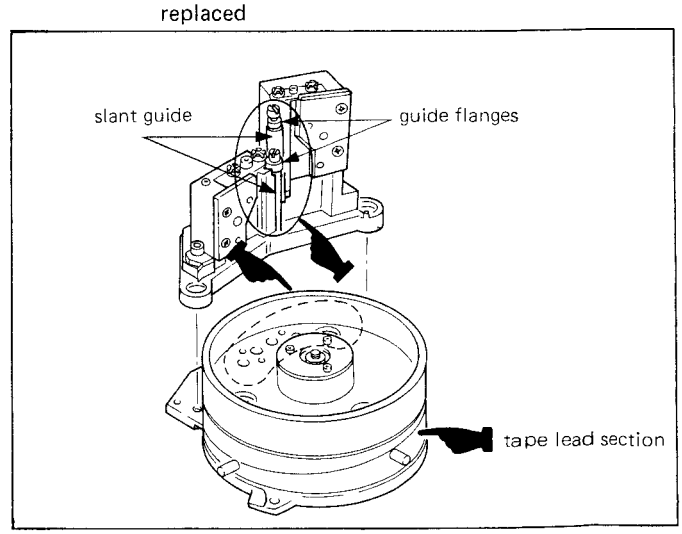
Fig. 4-4. Cleaning with compressed air



C. Cleaning required before a new slant guide ass'y is installed

- Clean the following parts shown in Fig. 4-5 with a swab
  - Between the guide posts and the area just under the guide flanges.
  - Surface of the lower drum which was hidden by the old slant guide assembly.
  - The lead on the lower drum.

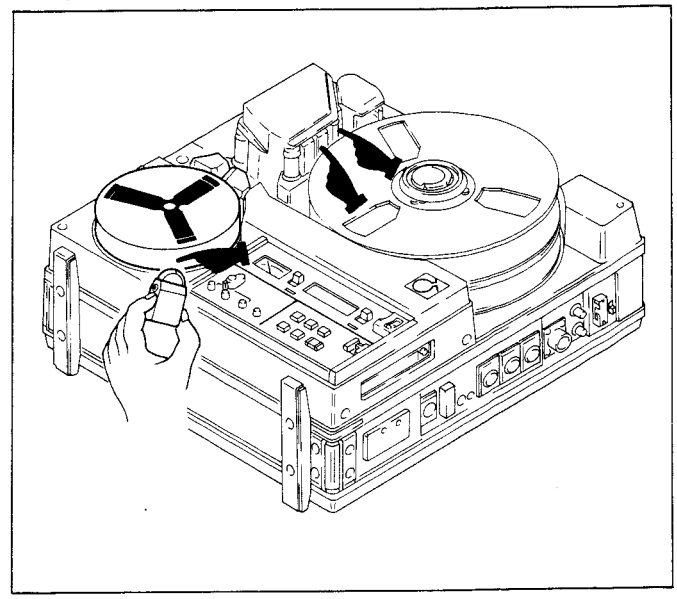
Fig. 4-5. Cleaning required when a slant guide ass'y is replaced



4-3. HEAD DEGAUSSING

1. The head is magnetized while the tape runs, and this causes signal deterioration. Degauss the following heads with a SONY HE-2 or HE-3 demagnetizer.
   - Video heads
   - Audio R/P and CTL heads
   - Video monitor head
2. Turn on the demagnetizer and bring it close to the head tip, but do not touch it to the head. Move the demagnetizer away from the head tip slowly and turn off the power when the demagnetizer is about one meter away from the head.

Fig. 4-6. Head degaussing



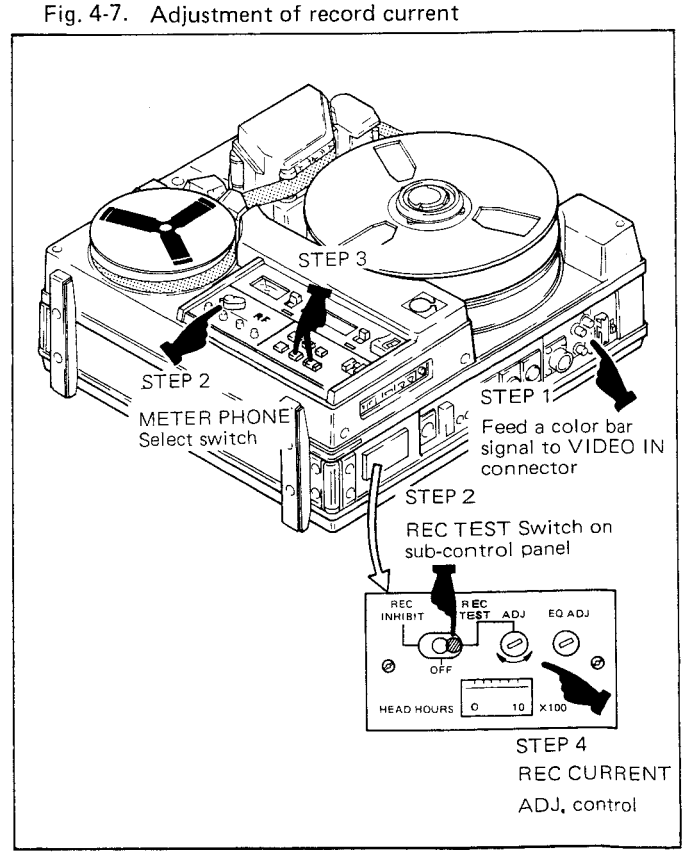
4-4. RECORD CURRENT CHECK

- Check the record current whenever a tape is changed and perform the necessary adjustments for the best recording conditions because the magnetic characteristics differ from tape to tape.
- The adjustment is necessary after the upperdrum is replaced.

Adjustment Procedure

1. Thread an ordinary tape and set the CAMERA LINE switch to the LINE. Connect a color bar signal to the VIDEO IN connector.
2. Set switches:
   - REC INHIBIT/OFF/REC TEST switch on sub-control panel —1 to . . . . . REC TEST
   - METER PHONE select switch to . . . . . RF
3. Depress the REC button together with the PLAY button to set up the REC TEST mode.
4. Adjust the REC CURRENT ADJ control on sub-control panel —1 for maximum deflection of the meter.

Fig. 4-7. Adjustment of record current



4-5. OPERATIONAL FUNCTION CHECKS

- Operation function checks should be done prior to operating the machine.

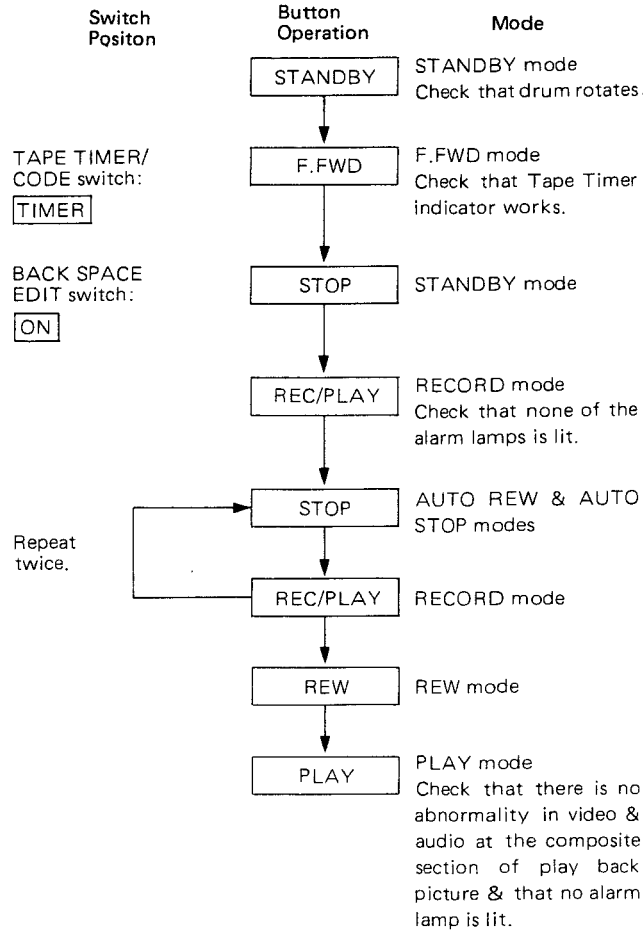
General Description

1. Following items are checked in this section:
   (1) Can the machine record and playback video and audio signals?
   2 Is the back space edit normal working properly?
   3 Is the tape running normally?
   4 Are alarm lamps lit?
2. Following equipments are necessary for the operational function checks:
   - BVH-500
   - Headphone
   - Video tape (V-16-64)
   - Monitor TV
   - Microphone
   - BP-90 or AC-500

Preparation

1. Connect the monitor TV, the headphone, the microphone, and the BP-90 battery or AC-500 to the BVH-500.
2. Supply the video signal to the BVH-500 or connect the camera to the BVH-500. Supply an audio signal to the AUDIO CH-1, CH-2, and CH-3 terminals.
3. Thread an ordinary tape, turn on the power, and then perform the following checks, following the flow chart on the right.

Flowchart of Operational Function Checks



4-6. TRACKING CHECK

- Check the shape of the RF envelope when alignment tape BR5-2 is played back to insure that tapes recorded on this machine can be played back on this and other compatible machines.

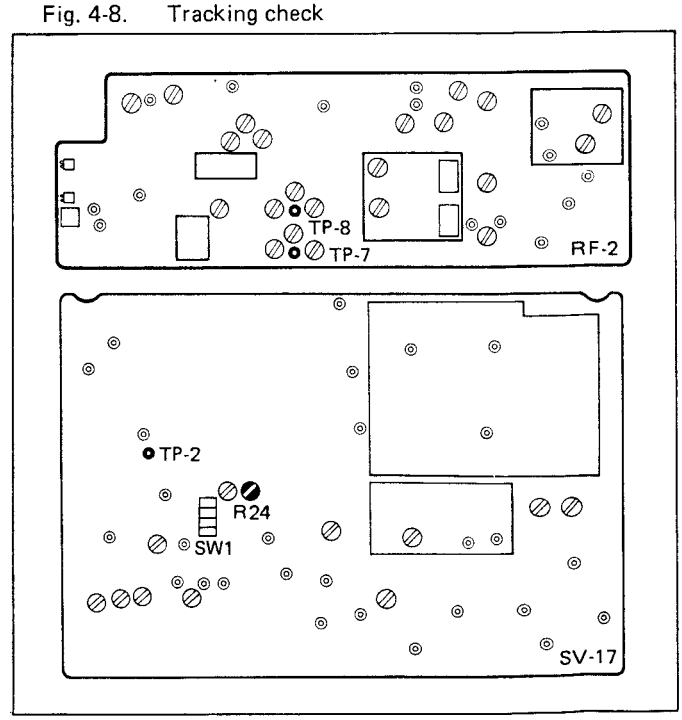
Check Procedure

1. Connect an oscilloscope as follows.

   CH-1: TP-7/RF-2
   CH-2: TP-8/RF-2
   TRIG: TP-2/SV-17 or SV/18

– NOTE –
The RF waveform can be observed by connecting the oscilloscope to pins 9 (HOT) and 8 (GND) of the 24 pin connector for the playback adaptor.

Fig. 4-8. Tracking check



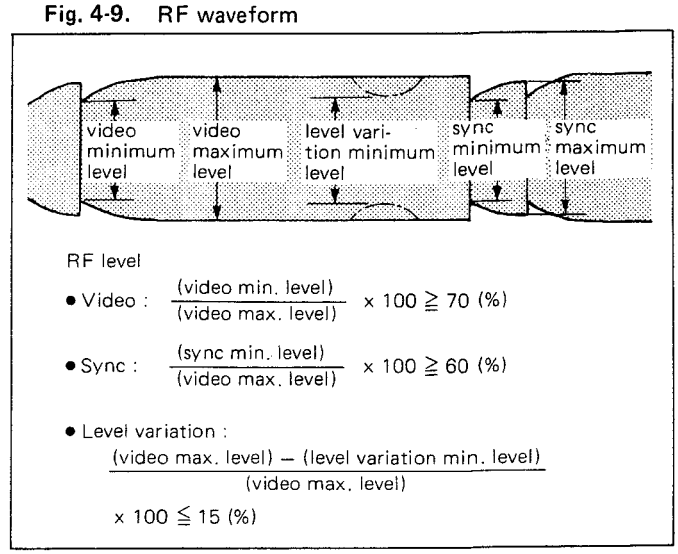
2. Play back the WHITE segment of alignment tape BR5-2.

3. Set the TRACKING switch (SW1/SV-17 or SV-18) to the variable state (SW1-1 to OFF & SW1-2 to ON) and adjust R24 for maximum RF envelope. Check that the conditions shown in Fig. 4-9 are satisfied by the RF envelope. If not, adjust the tracking, referring to Section 9-5-2.

4. Return the TRACKING switch to the fixed position (SW1-1 to ON & SW1-2 to OFF). Check that the RF waveform does not change. If the waveform changes, it is because the CTL head is incorrectly positioned. Correct the position of the CTL head referring to Section 9-7. Adjst the drum PG phase (Section 9-8), and perform the overlap adjustment (Section 9-8).

– CAUTION –
Do not forget to return the TRACKING switch to the fixed position after the adjustment. If the switch is not returned to the fixed position, recording will probably be made with incorrect tracking, depending on the position of the TRACKING volume control (R24/SV-17 or SV-18).

Fig. 4-9. RF waveform



4-7. HEAD TIP PROJECTION CHECK

Preliminary Explanation

1. Five hundred operating hours is the normal operating life of the video and the sync heads mounted on the upper drum.

2. The operating life can vary greatly, however, depending on operating conditions. Dusty conditions, high humidity and low temperatures will reduce operating life.

3. Recording can be done if the distance from the drum surface to the tip of the video and sync heads is more than 50 μm. See Fig. 4-10.

4. Measure the distance the heads project after the upper drum operates 500 hours or if the machine is used in poor operating conditions.

5. The distance the head tip projects is measured with the upper drum eccentricity measurement jig. See Fig. 4-11. This new type jig can measure all heads on the BVH-500, BVH-1000 and BVH-1100. The former jig could not measure the sync head of BVH-500.

Fig. 4-10. Head tip projection

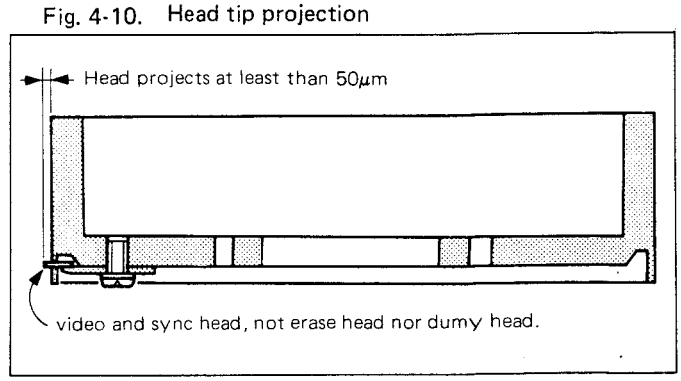
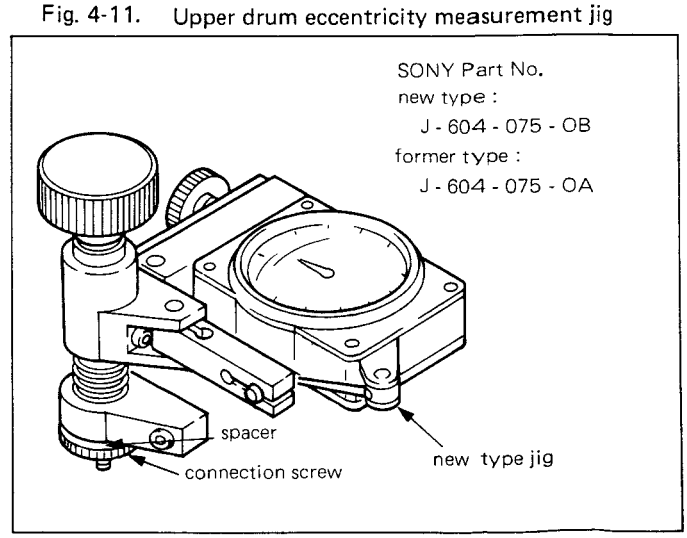


Fig. 4-11. Upper drum eccentricity measurement jig



6. Besides the upper drum eccentricity measurement jig, the head tip projection measurement jig shown in Fig. 4-12 is available. This jig cannot measure the eccentricity of the upper drum but can measure the projection of each rotary head without removing the panels. By changing the position of the Positioning Plate as shown in Fig. 4-12, the jig can measure the head tip projection with the drum lid attached or detached.

7. The rotary heads cannot be replaced as a single part. When it is necessary to replace a head, the whole upper drum assembly must be replaced.

A. Measurement with Upper Drum Eccentricity Measurement Jig

- The measurement procedure with the new eccentricity measurement jig will be described here. When the former jig is used, only the video head projection can be measured.

Measurement Procedure

Removal of Panels

1. Remove the S guide cover, the T guide cover, and the drum panel as shown in Fig. 4-13.

Adjustment of Upper Drum Eccentricity Measurement Jig

2. Remove the connection screw shown in Fig. 4-14 and remove the spacer. Retighten the connection screw.

3. Confirm that the tip of the dial gauge probe is at the center of the white plastic pin inserted in the measurement arm. If it is not at the center, adjust the dial gauge probe by moving it in the direction shown by the arrows in Fig. 4-14.

– CAUTION –

If this adjustment is poor, the zero point adjustment of the dial gauge cannot be made and/or an abnormal force is applied to the head and drum, damaging them.

4. Put a mark on the tip of the white plastic pin shown in Fig. 4-14 with water soluble ink.

– NOTE –

This mark is for confirming the right height of the measurement jig when it is attached to the machine.

Fig. 4-12. Head tip projection measurement jig

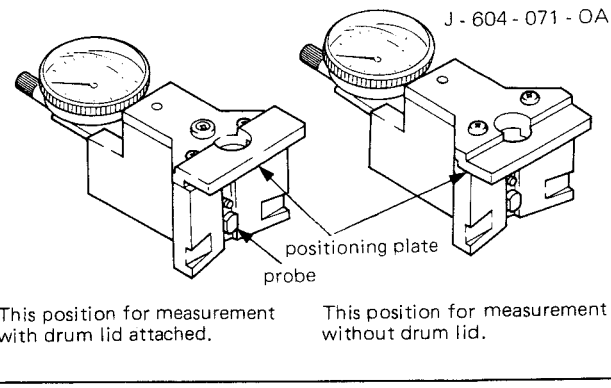


Fig. 4-13. Removal of panels

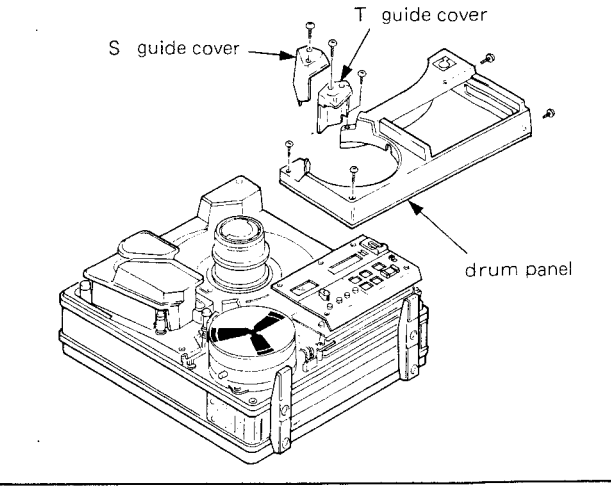
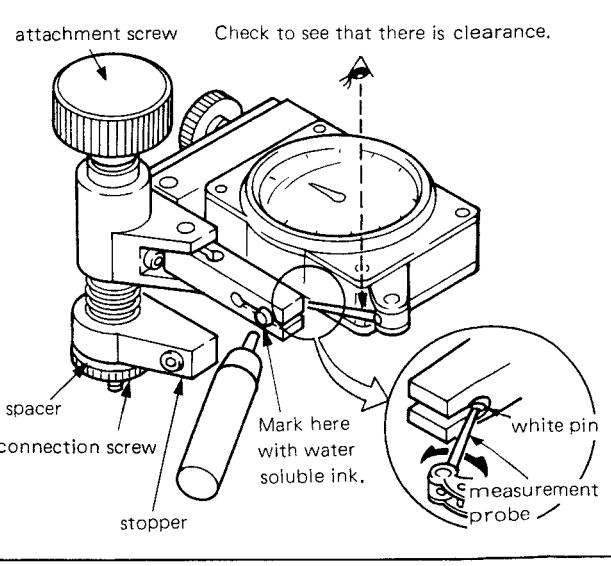


Fig. 4-14. Confirmation and adjustment of upper drum eccentricity measurement jig



Attachment of Measurement Jig and Height Setting

5. Turn the zero point adjusting screw of the measurement jig fully counterclockwise.

6. Attach the measurement jig to the drum base by screwing the attachment screw into the mounting screw hole on the drum base while holding the stopper (shown in Fig. 4-14) to the side of the lower drum.

7. Move the dial gauge in the direction Ⓐ shown in Fig. 4-15 and move it in the direction shown by arrow Ⓑ Ⓒ so that the half of the circle mark on the attachment screw shaft is hidden.

– NOTE –

Now the video head projection can be measured. To measure the sync head projection, move the dial gauge in direction Ⓐ then push it all the way in the direction Ⓒ.

8. Turn the upper drum by hand as shown in Fig. 4-16 so that the video head comes close to the measurement jig.

9. Adjust the zero point adjusting screw of the jig so that the needle of the dial gauge points to zero.

10. Turn the upper drum slightly. Check that the place shown in the detailed view of Fig. 4-16 is colored with the ink used in Step 4. If the colored place and the position of the head are different, insert the M4 washer or something similar between the measurement jig and the drum base.

– CAUTION –

If the height of the measurement jig is not adjusted correctly, the head tip projection cannot be measured correctly and/or an excessive force is applied to the head.

Measurement

11. Turn the upper drum slowly and confirm that the head tip projection is more than 50 μm. If the projection of either of the heads is less than 50 μm, replace the upper drum, referring to Section 8-1.

– NOTE –

We recommend replacing the upper drum when projection is less than 50 μm, even though some heads in this condition can still be used.

B. Measurement with Head Tip Projection Measurement Jig

- The distance the head tip projects is measured with the drum lid attached.

Measurement Procedure

Attachment and Zero Adjustment of Measurement Jig

1. As shown in the upper illustration in Fig. 4-17, place the measurement jig on the drum lid any place except where there is a head. Push the jig to the side of the upper drum slowly as shown in the lower illustration.

Fig. 4-15. Attachment of measurement jig

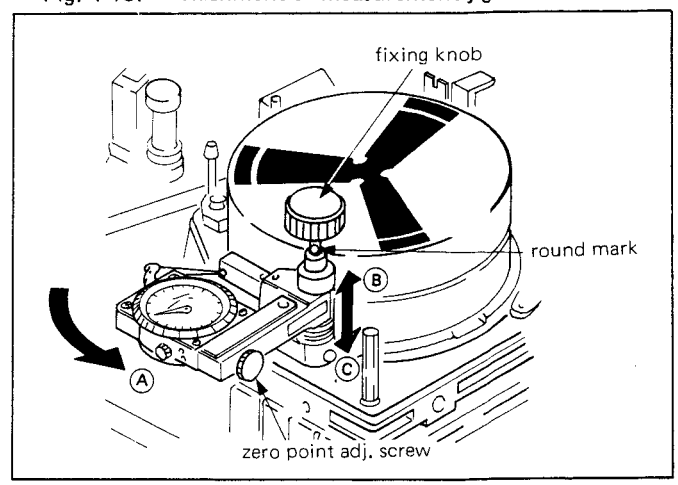


Fig. 4-16. Height adjustment of measurement jig

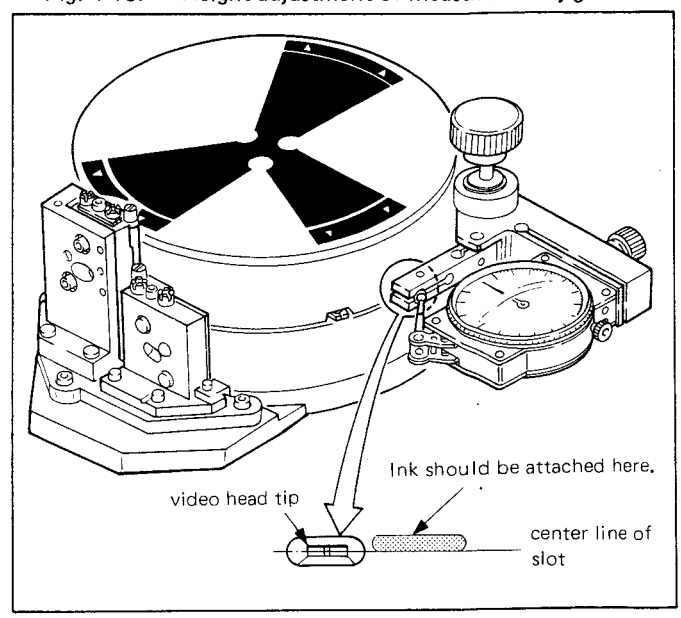
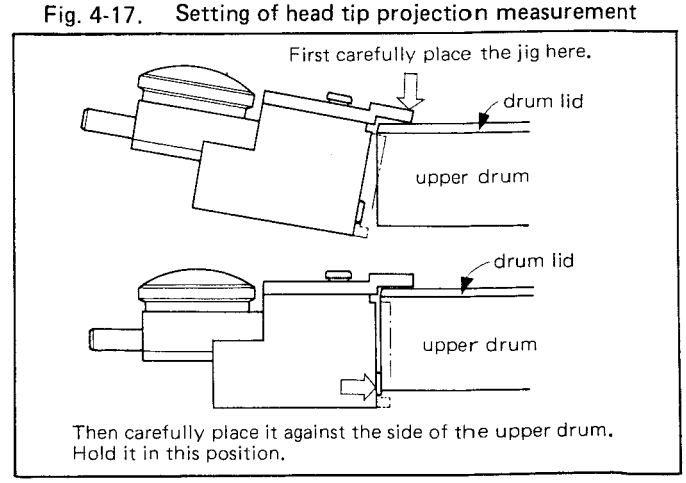


Fig. 4-17. Setting of head tip projection measurement



2. Push the push button of the jig shown in Fig. 4-18 several times and check that the needle of the dial gauge always returns to the same point. Set the needle to zero on the scale.

Measurement

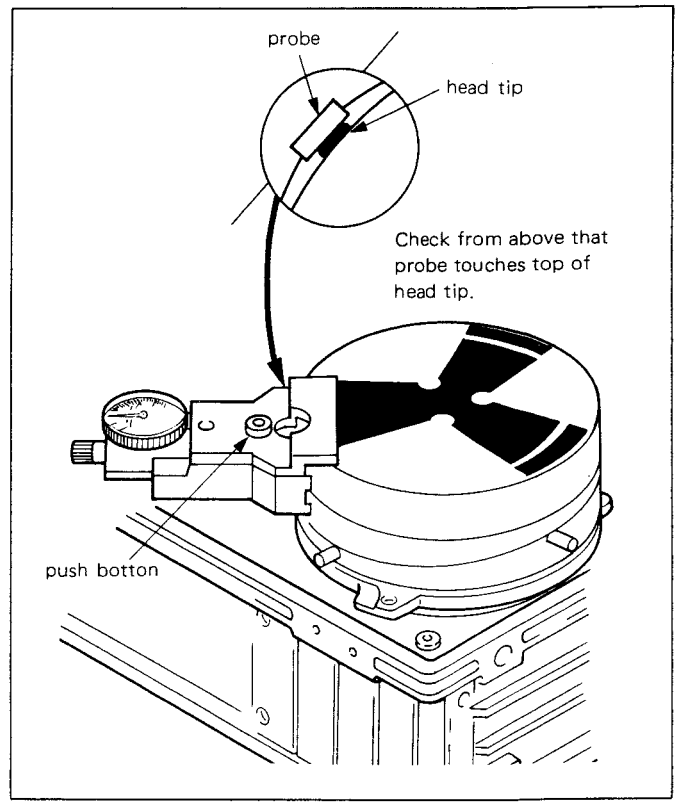
3. Remove the measurement jig. Turn the upper drum by hand and stop it when the video head comes to the point shown in Fig. 4-18. Set the jig so that its probe touches the tip of the video head.

– CAUTION –

- **Attach the measurement jig as in Step 1. Do not slide the probe over the surfaces of the upper drum before putting the probe on the head because the head will be damaged.**
- **Do not measure the projection while the drum is rotating.**

4. Read the value indicated by the needle after pushing the push button several times and confirm that the value is more than 50 μm. Measure the projection of the sync head in the same manner. If the projection of any one of the heads is less than 50 μm, we recommend replacing the upper drum, referring to Section 8-1.

Fig. 4-18. Measurement by measurement jig for head tip projection

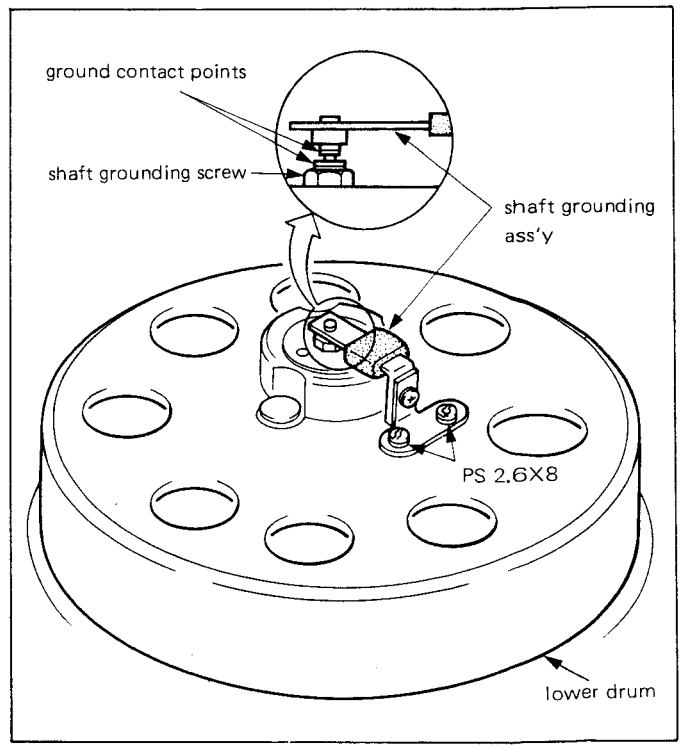


4-8. MAINTENANCE OF SHAFT GROUNDING ASS'Y

Preliminary Explanation

1. Nominally it is not necessary to service the shaft grounding ass'y normally for 1000 hours. If noise like snow noise appears on the picture or an abnormal mechanical noise is heard from the drum section, check the following items and take the necessary measures.
   - Interference due to cable position:
     Check that the cable of the connector CN44 is above transistor Q62 on the RF-2 board.
   - No grease:
     Check that the contact points of the shaft grounding screw and the shaft grounding assembly, shown in Fig. 4-19, are greased.
   - Wear of contact points:
     Check that the contact points of the shaft grounding screw and the shaft grounding assembly shown in the detailed view in Fig. 4-19 are not worn out.
2. When applying grease, perform all steps outlined in following section "Replacement of Shaft Grounding Ass'y" except Step 4. Use KANTO KASE conductive grease GE-4H or equivalent.

Fig. 4-19. Maintenance of shaft grounding assembly



Replacement of Shaft Grounding Ass'y

Removal

1. Remove the bottom plate and the six screws (B3x8) fixing the battery case.
2. Remove the six support screws holding the RF-2 board, the shield plate, and the SY-50 board.
3. Carefully open out the RF-2 board and the SY-50 board. Remove the two screws securing the shaft grounding assembly shown in Fig. 4-19.
4. Remove the shaft grounding screw while holding the upper drum. Thread and tighten the replacement shaft grounding screw.

Cleaning

5. Wipe old grease off the shaft grounding screw and shaft grounding assembly.

Assembly

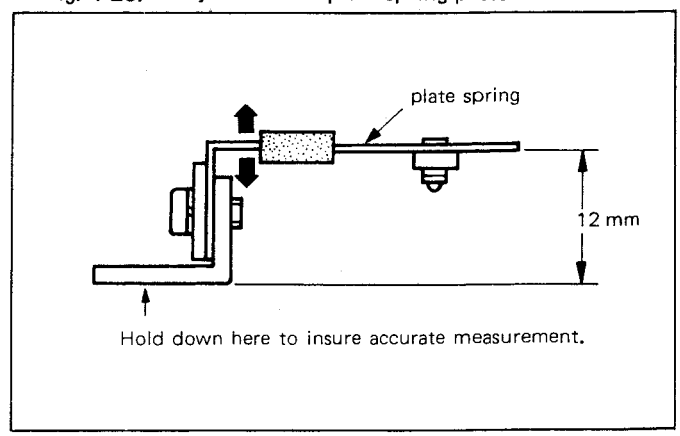
6. Confirm that clearance between the flat plane and the plate spring of the shaft grounding assembly is 12 mm as shown in Fig. 4-20. If necessary, loosen the screw securing the plate spring, then adjust and retighten it.

– NOTE –

The optimum contact pressure between the shaft grounding assembly and the shaft grounding screw is 5 grams. If the pressure is too weak, noise like a snow noise appears on the picture. If it is too strong, a mechanical noise is heard.

7. Attach the shaft grounding assembly with the two screws (PS2.6 x8) temporarily.
8. Adjust the position of the shaft grounding assembly so that the upper contact point makes contact at the center of the lower contact point. Tighten down the two screws.
9. Apply a conductive grease to the contact points with a bamboo spit or a toothpick.
10. Reinstall the parts by reversing the removal procedure.

Fig. 4-20. Adjustment of plate spring pressure



SECTION 5
PARTS REPLACEMENT AND ADJUSTMENT OF REEL TABLE SYSTEM

5-1. HEIGHT ADJUSTMENT OF REEL TABLE

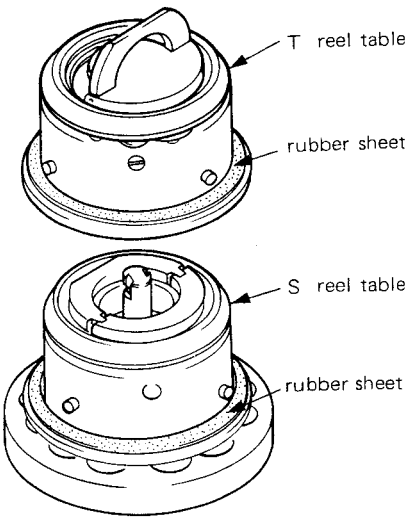
Preliminary Explanation

1. The height of the reel table was adjusted precisely at the plant before shipment. If a reel whose flange is not stable is used, the tape touches the reel flange and will be damaged. When the tape is changed, always check the tape to see if it has contacted the flange.
2. If the tape obviously contacts the flange, adjust the height of the reel table. There are two methods for adjusting the height of the reel table.
   - Adjustment method A is to change the thickness of the rubber sheet fixed to the reel table. See Fig. 5-1.
   - Adjustment method B is to disassemble the reel tables as shown in Figs. 5-3 and 5-5 and change the thickness of the upper and lower spacers — always taking care that if a thickness is taken off one place, it is added to the other.
     Note: We recommend Adjustment method A.
3. If a reel table from another machine is used, the tape may contact the reel flange.
4. **Check Procedure for Reel Table Height**
   (1) Place the machine in a horizontal position and set up the F.FWD mode.
   (2) Check that the tape does not touch the flanges of the supply and take-up reels.
   (3) Set up the machine in the REW mode and check that the tape does not touch the flanges of the supply and take-up reels.
   (4) Place the machine in a vertical position and repeat Steps (1) to (3).

— NOTE —
It is not necessary to perform this adjustment when the tape touches the flanges lightly and the tape is not damaged.

5. To perform adjustment method B, prepare the following stop ring pliers.
   J-7 SONY Part No. J-604-166-0A

Fig. 5-1. Adjustment of reel table height by adjustment method A



Kinds of rubber sheets and part numbers

Thickness of rubber sheet	SONY Part No.
1.475	3-656-975-11
1.575	3-656-975-21
*1.675	3-656-975-02
1.775	3-656-975-31
1.875	3-656-975-41
1.975	3-656-975-51

* Normally, the 1.675mm sheet is attached.

- If upper reel flange touches the tape, replace the rubber sheet with a thicker sheet.
- If lower reel flange touches the tape, replace the rubber sheet with a thinner sheet.

5-1-1. Reel Height Adjustment Using Adjustment Method A

Adjustment Procedure

1. Remove the rubber sheet so that the reel table will not be damaged.

— NOTE —
Wipe the adhesive (of the tape) off the reel table.

2. Chose a suitable rubber sheet according to the instructions shown in Fig. 5-1 and glue it evenly to the reel table.

5-1-2. Take-up Reel Height Adjustment Using Adjustment Method B

Adjustment Procedure

Disassembly

1. Remove the bottom, the SV-17 board, the AU-10 board, and the take-up reel table.
2. Push the plunger of the solenoid with a finger to set up an energized state.
3. Remove the drive belt, the take-up reel pulley, and the compression spring shown in Fig. 5-2.

– CAUTION –
Be careful not fold the drive belt.

4. Remove the stop ring with the pliers and pull out the reel shaft in the direction shown by the arrow in Fig. 5-3. Arrange the removed parts as shown in Fig. 5-3.

Adjustment

5. Change the spacer according to the instruction in Fig. 5-3.

– CAUTION –
Never leave a spacer out. If any of the spacer is eliminated, play of the reel table will be excessive.

Reassembly

6. Reassemble the removed parts by reversing the removal procedure, referring to Fig. 5-3. Install the stop ring.
7. Check that the play of the reel shaft is not more than 0.1 mm.

– NOTE –
If play is excessive even though the thickness and number of spacers have not been changed, check that the stop ring is seated in the groove on the reel shaft.

8. Reverse the order of Steps 1 and 3 to finish reassembly.

– CAUTION –
Install the belt so that the glossy surface is inside.

Fig. 5-2. Preparation for height adjustment of reel table

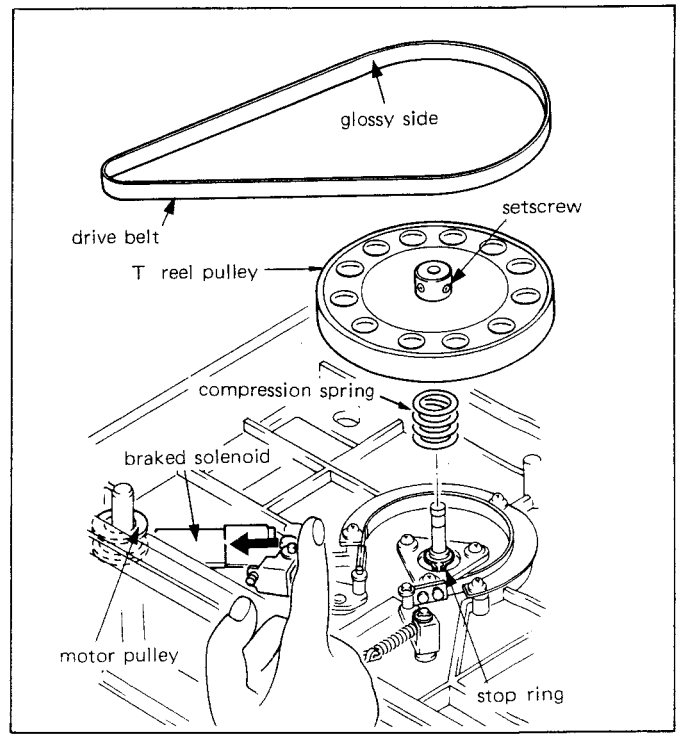
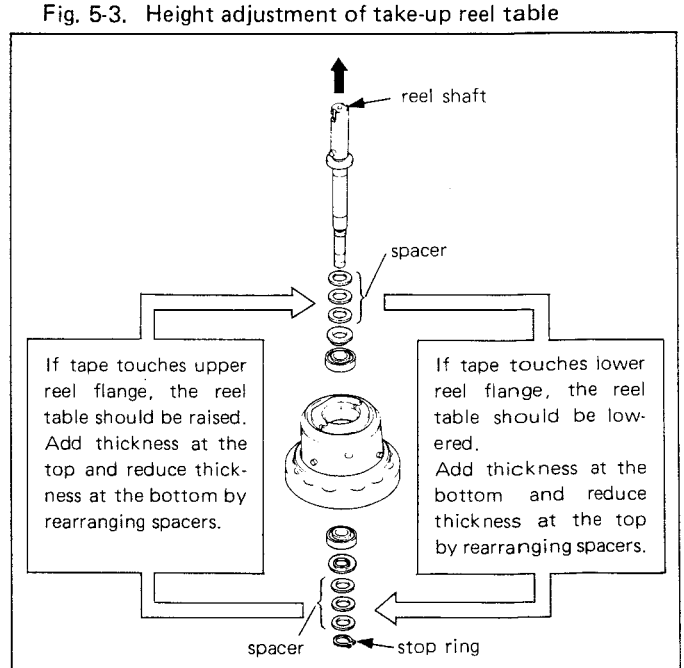


Fig. 5-3. Height adjustment of take-up reel table



★ **Spacers and part numbers**

Thickness [mm]	SONY Part No.
0.5	3-656-988-01
0.2	3-656-988-11
0.1	3-656-988-21

5-1-3. Supply Reel Height Adjustment Using Adjustment Method B

Adjustment Procedure

Disassembly

1. Remove the take-up reel table and the drive belt.

   – CAUTION –
   Be careful not to fold the belt during removal.

2. Push the plunger of the brake solenoid with a finger to set up an energized state.

3. Remove the stop ring with the pliers and arrange the removed parts as shown in Fig. 5-5.

Adjustment

4. Change the spacer according to the instructions in Fig. 5-5.

   – CAUTION –
   Never leave a spacer out. If any of the spacer is eliminated, the play of the reel table will be excessive.

Reassembly

5. Reassemble the supply reel table by reversing Step 3, referring to Fig. 5-5, and install the stop ring.

   – CAUTION –
   Insert the bearing straight. Do not force it.

6. Check that the play of the supply reel table is not more than 0.1 mm.

– NOTE –
If play is excessive even though the thickness and number of spacers have not been changed, check that the stop ring is seated in the groove.

7. Install the drive belt and the take-up reel table.

   – CAUTION –
   Install the drive belt so that the glossy surface is inside.

Fig. 5-4. Preparation for height adjustment of "S" reel table

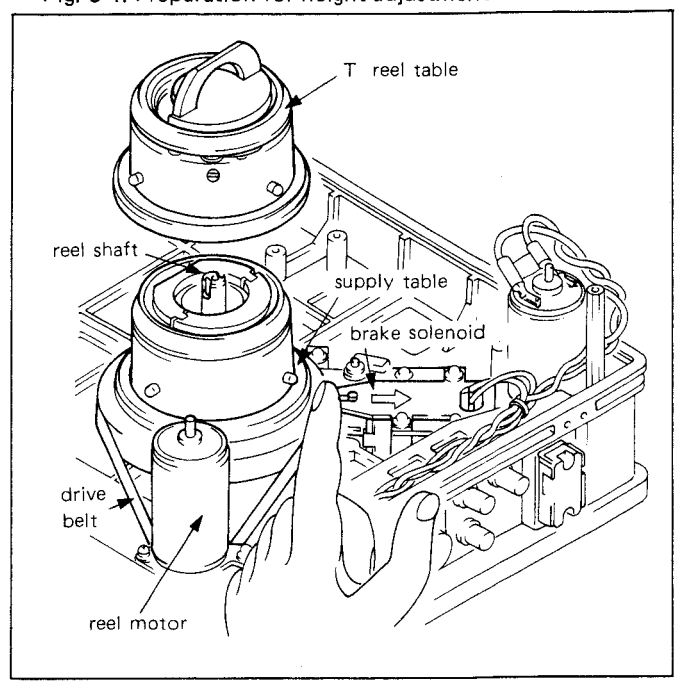
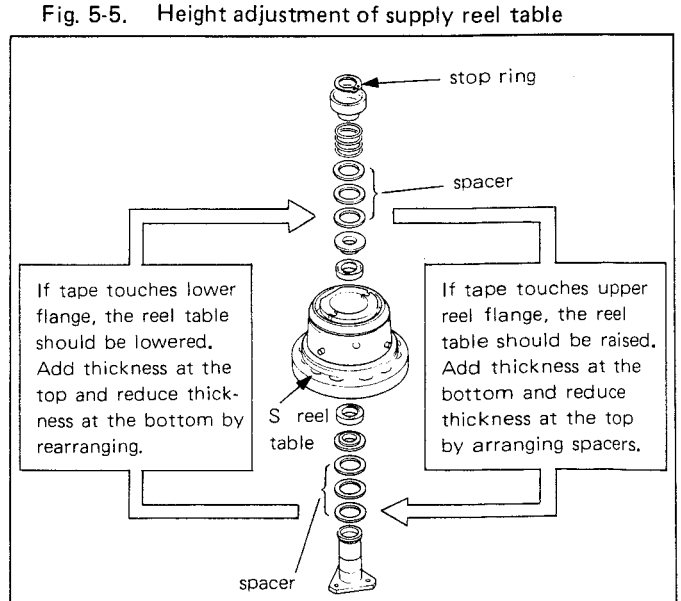


Fig. 5-5. Height adjustment of supply reel table



Spacers and part numbers

Thickness [mm]	SONY Part No.
0.5	3-656-988-01
0.2	3-656-988-11
0.1	3-656-988-21

5-2. ADJUSTMENT OF MECHANICAL REEL BRAKE

Preliminary Explanation

1. An electro-magnetic brake and a mechanical brake are used as reel brake.

   (1) A current is fed to the electro-magnetic brake during the transition from F.FWD to REW/FWD/STOP or from REW to R.FWD/FWD/STOP so that the motor rotates in the opposite direction that the tape is running.

   (2) The mechanical brake operates together with the electro-magnetic brake during the time the F.FWD, the REW, or the FWD mode changes to the STOP mode.

2. The adjustment of the mechanical brake consists of the following.
   [I] Brake Solenoid Stopper Adjustment:
   To adjust the plunger stroke of the brake solenoid.
   [II] Brake Band Release Adjustment:
   To adjust the slack of the brake band when the planger is energized (when the brake is released) by the setscrew shown in Fig. 5-6.
   [III] Break Lever Stopper Adjustment:
   To adjust the clearance between the stopper and the rubber roller shown in Fig. 5-6 when the reel table is turned in the REW or FWD direction when the plunger is not energized (in the braked state).
   [IV] Brake Torque Adjustment:
   To adjust the torque necessary to rotate the reel table at a constant rate in the FWD or REW direction when the plunger is not energized (when the brake is off).

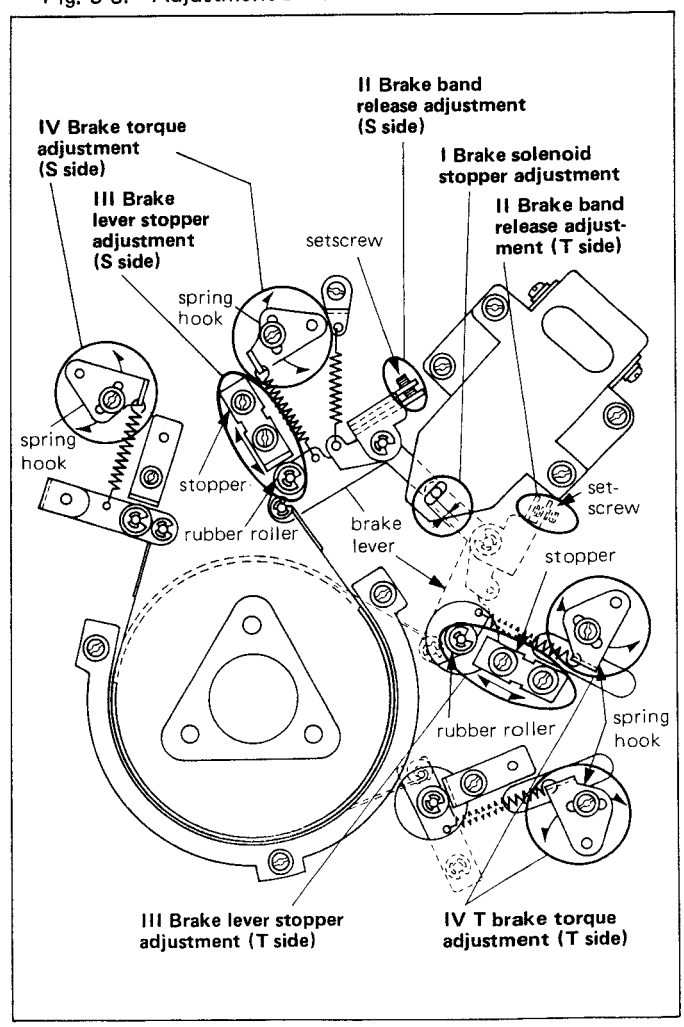
3. Necessary adjustment must be done in this order: I → II → III → IV. It is not necessary, however, perform all four adjusts, but the final adjustment cannot be omitted. For example, the adjustment order may be II → III → IV or III → IV.

4. Trouble shooting the Mechanical Brake

   (1) If the tape is abnormally slack when changing from the REW or the F.FWD modes to the STOP mode.
   ⟶ Check the brake torque.

   (2) If the winding time required for the F.FWD or the REW is excessive.
   ⟶ Check that the brake plunger is completely energized.
   ⟶ Check that the brake band does not touch the reel pulley when the brake is released.
   ⟶ Check the reel motor.
   ⟶ Check that the harness of the AU-10 board does not touch the pulley.

Fig. 5-6. Adjustment of reel brake



5. The following equipment is necessary for adjusting the brake torque:

	SONY Part No.
Tension scale (200 gr.) J-4	J-604-163-0A
Empty reel J-14	Commercially available

6. When the brake solenoid is replaced, perform all the adjustments I to IV in sequence.

Adjustment Procedure

- Remove the S and T guide covers and the drum panel before beginning this procedure.

I. Adjustment of Brake Solenoid Stopper

1. Push the plunger by finger to energize the solenoid.
2. Check that the clearance between the end of the slot of the stopper plate shown in Fig. 5-7 and the solenoid pin is 3.5 mm. If not, adjust the position of the stopper plate.

– CAUTION –
When making this measurement, do not force the calipers against the solenoid pin or it will more slightly and distort the measurement.

II. Brake Band Release Adjustment

Supply Side

1. Push the brake plunger by finger to set up its energized state.
2. Carefully remove the take-up reel table and the S drive belt from the S reel pulley so that the belt is not folded.
3. Turn the supply reel table rapidly by hand and confirm that:
   - The reel table turns smoothly.
   - The reel table keeps running for a while after being released.
   - There is no abnormal sound caused by the contact of the reel pulley and the brake band during the reel table rotation.
4. Adjust the adjustment screw so that there is a small clearance at positions A and B shown in Fig. 5-8.
5. Reconfirm the items in Step 3 after adjusting the adjustment screw and fix it with a locking compound.

– CAUTION –
- **Never move the band retainer plate.**
- **If the brake band is too slack at positions A and B, the brake will not work effectively.**

6. Reinstall the removed parts by reversing the removal procedure.

Fig. 5-7. Adjustment of brake solenoid stopper

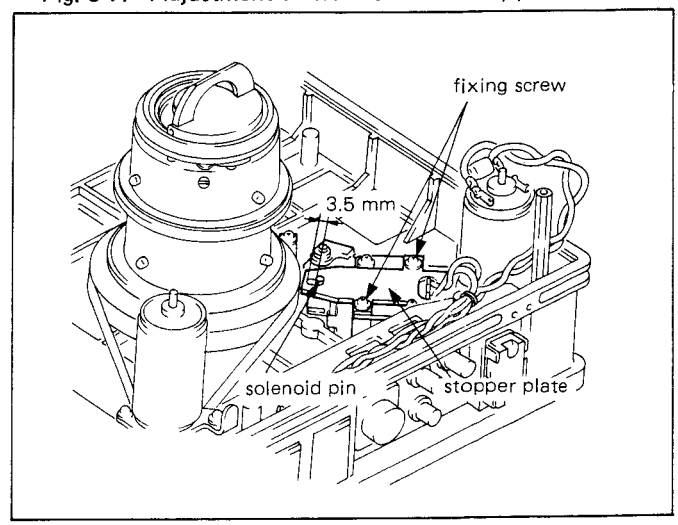
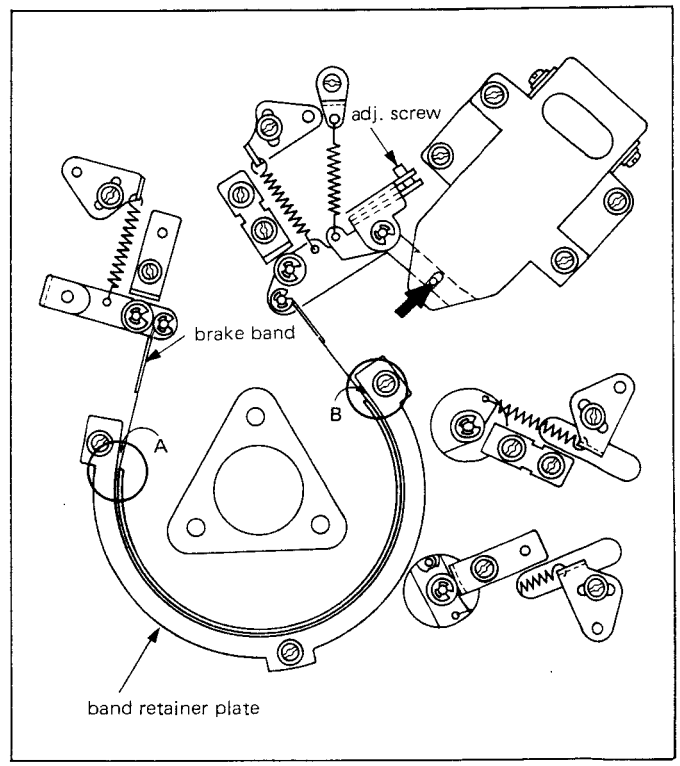


Fig. 5-8. Adjustment of S brake band release



Take-up Side

1. Remove the bottom, the SV-17 board and the AU-10 board.
2. Push the brake plunger by finger to set up the energized state.
3. Remove the T drive belt.
4. Turn the take-up reel table rapidly by hand and confirm that.
   - The reel table turns smoothly.
   - The reel table keeps running for a while after it is released.
   - There is no abnormal sound caused by the contact of the reel pulley and the brake band during rotation.
5. Adjust the adjusting screw so that there is a small clearance at positions A and B shown in Fig. 5-9.
6. Reconfirm the items in Step 4 after adjusting the adjustment screw and fixing it with a locking compound.

   – CAUTION –
   - **Never move the band retainer plate.**
   - **If the brake band is too slack at positions A and B, the brake will not work effectively.**
7. Reinstall the removed parts by reversing the removal procedure.

III. Brake Lever Stopper Adjustment

1. Turn the power on and off several times to set up the state in which the brake functions.
2. Check the positions of stoppers "S" and "T" as follows and adjust, if necessary.

Supply Side

(1) Turn the supply reel table clockwise and check that there is no clearance at location S shown in Fig. 5-10 and that there is a 1 mm clearance between stopper "S" and the rubber roller.

(2) If there is no 1 mm clearance adjust the position of stopper "S".

Take-up Side

(1) Turn the take-up reel table counterclockwise and check that there is no clearance at location T shown in Fig. 5-10 and that there is a 1 mm clearance between stopper "T" and the rubber roller.

(2) If there is no 1 mm clearance, adjust the position of stopper "T".

Fig. 5-9. Adjustment of T brake band release

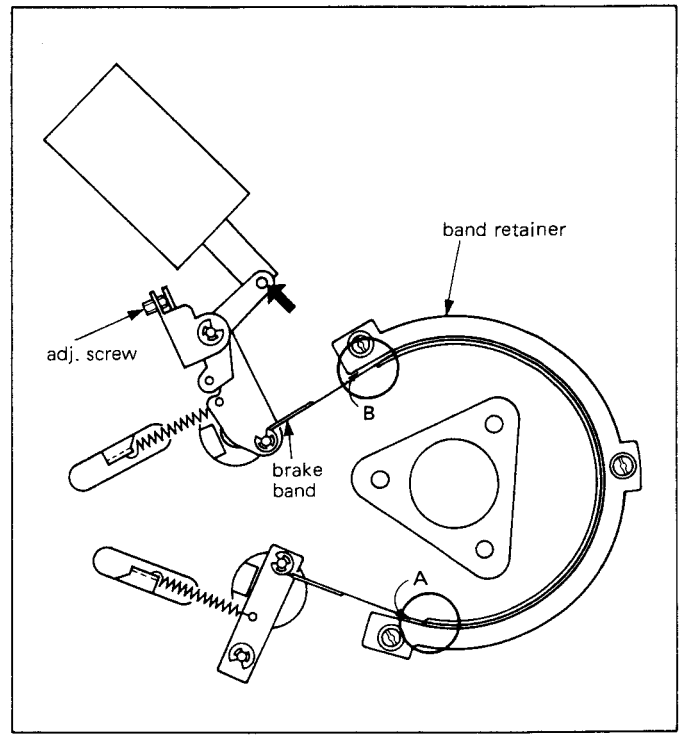
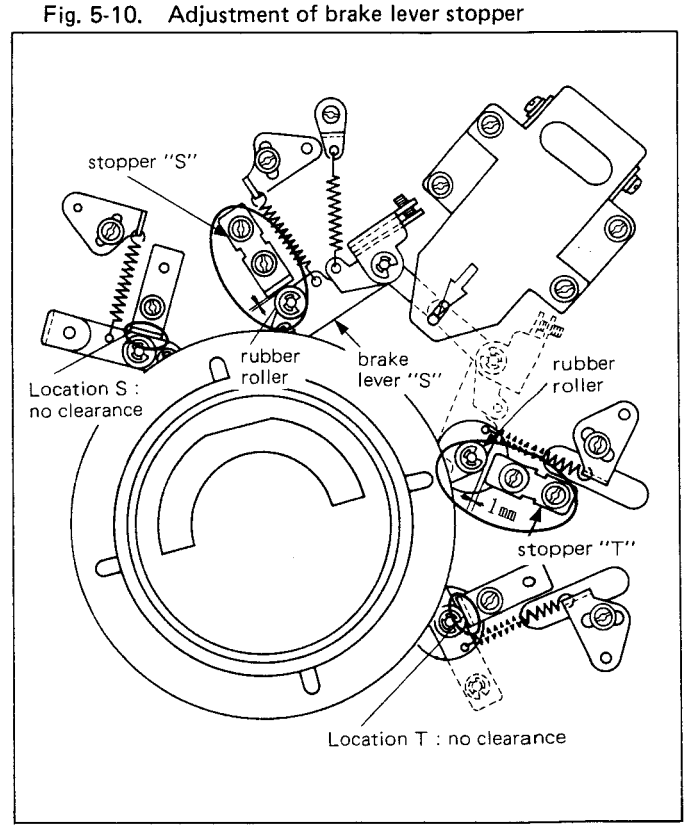


Fig. 5-10. Adjustment of brake lever stopper



IV. Brake Torque Adjustment

Preparation

1. Tie a string of about 180 cm to an empty reel and make a loop at the other end of the string as shown in Fig. 5-11.
2. Hold the tension scale horizontally and adjust the adjusting screw so that the needle points to zero.
3. Lay the machine down horizontally and turn the power on and off several times. (or release the brake solenoid with your finger) in order to set up the state in which the brake functions.

S Reel Brake Torque Adjustment

3. Put the empty reel with the string on the supply reel table and wind the string clockwise around the reel.
4. Hook the 200 gr tension scale to the end of the string. Pull the scale at the constant speed of about 200 mm/sec and confirm that the scale reading is 150 gr ± 15 gr. If this value is not obtained, adjust the position of spring hook "A" shown in Fig. 5-12 and test the brake torque. Repeat the adjustment until the specified value is obtained.
5. Wind the string counterclockwise around the reel and hook the tension scale to the end of the string. Pull the string at a constant speed of about 200 mm/sec and confirm that the scale reading is 200 gr ± 20 gr. If this value is not obtained, adjust the position of spring hook B shown in Fig. 5-12 and test the brake torque again. Repeat the adjustment until the specified value is obtained.

Take-up Reel Table Brake Torque Adjustment

7. Put the empty reel with the string on the take-up reel table and wind the string clockwise around the reel.
8. Hook the 200 gr tension scale to the end of the string and pull the scale at a constant speed of about 200 mm/sec and confirm that the scale reading is 150 gr ± 15gr. If not, adjust the position of spring hook C shown in Fig. 5-12 and test the brake torque again. Repeat the adjustment until the specified value is obtained.
9. Wind the string counterclockwise around the reel and hook the tension scale on the end of the string. Pull the string to the constant speed of about 200 mm/sec and confirm that the scale reading is 100 gr ± 10 gr. If not, adjust the position of spring hook D shown in Fig. 5-12 and test the brake torque again. Repeat the adjustment until the specified value is obtained.

Fig. 5-11. Measurement tool for brake torque

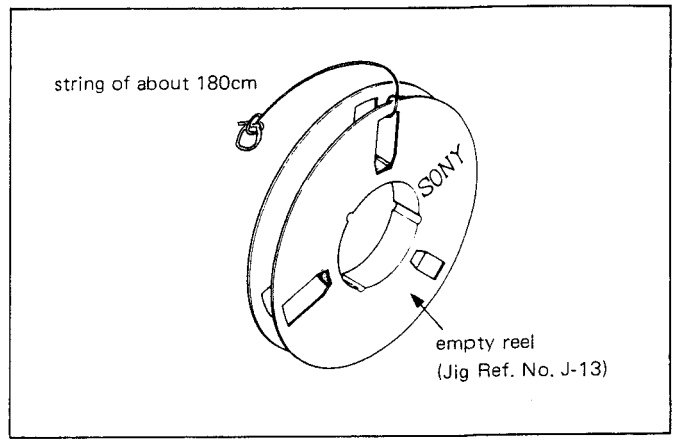
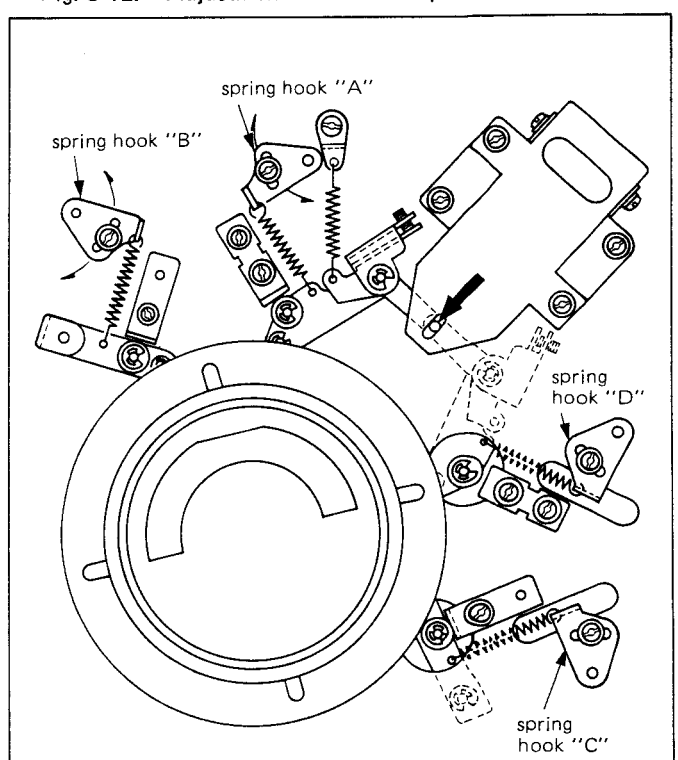


Fig. 5-12. Adjustment of brake torque



Specification and adjustment of brake torque

Reel table	Specification (gram)	Adjustment point
S reel: CW	150 ± 15	Spring hook "A"
S reel: CCW	200 ± 20	Spring hook "B"
T reel: CW	150 ± 15	Spring hook "C"
T reel: CCW	100 ± 10	Spring hook "D"

5-3. REPLACEMENT OF BRAKE BAND

5-3-1. Replacement of S Brake Band

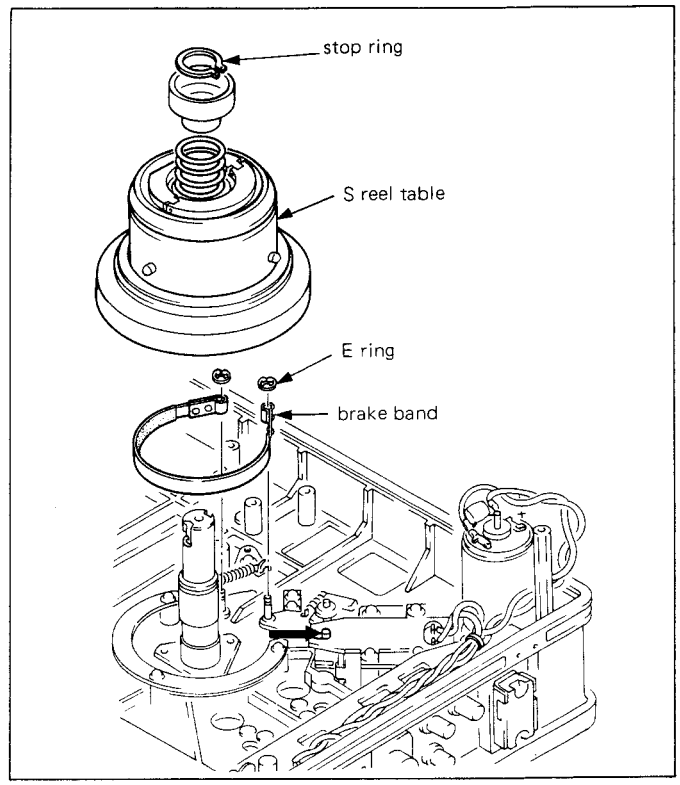
Replacement Procedure

1. Remove the S and T guide covers, the drum panel and the reel panel.
2. Remove the take-up reel table and the drive belt from the supply reel table so that the belt is not folded.
3. Push the brake plunger by finger to set up the state in which the brake functions.
4. Remove the stop ring with the pliers as shown in Fig. 5-13 and arrange the removed parts in the order of removal.

   – CAUTION –
   Do not mix up the removed parts, especially the spacers, because the height of the reel table will be changed if the order of the spacers is changed.
5. Remove the two E rings which retain the brake band, as shown in Fig. 5-13. Remove the brake band. Reinstall the E rings after the replacement brake band is fitted.
6. Reinstall the parts removed in step 4.
7. Perform the supply reel brake adjustments in adjustment items II, III and IV in this order, referring to Section 5-2.
8. Reinstall the parts removed in steps 2 and 1 in that order.

   – CAUTION –
   Install the belt with the glossy side inside. Do not fold the belt during installation.

Fig. 5-13. Replacement of "S" brake band

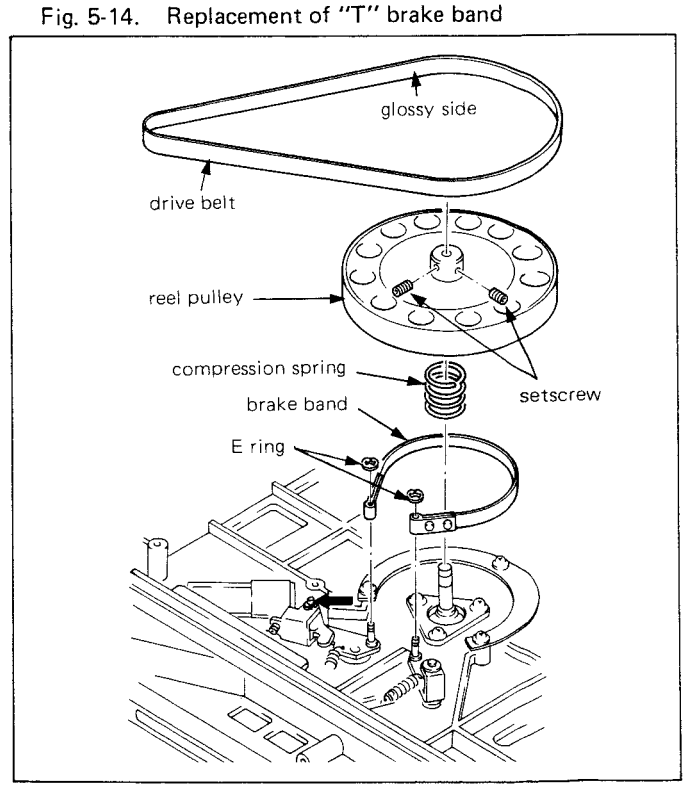


5-3-2. Replacement of T Brake Band

Replacement Procedure

1. Remove the bottom the SV-17 board and the AU-10 board.
2. Push the brake plunger by finger to set up the energized state.
3. Remove the drive belt as shown in Fig. 5-14. Loosen the two set-screws fixing the reel pulley. Then remove the pulley and the compression spring.
4. Remove the two E rings retaining the brake band. Fit the new brake band and install the E rings.
5. Install the compression spring on the reel shaft, push the reel pulley down while turning until it stops. Tighten the two set-screws.
6. Perform the take-up reel adjustment in adjustment items II, III, and IV, in this order referring to Section 5-2.
7. Install the drive belt on the reel motor pulley and the reel pulley with the glossy side inside.
8. Reinstall the parts removed in step 1.

Fig. 5-14. Replacement of "T" brake band



5-4. REPLACEMENT OF BRAKE SOLENOID

Replacement Procedure

Removal

1. Remove the S and T guide panels, the drum panel, and the reel panel.
2. Remove the take-up reel table and the S drive belt.
3. Remove the supply reel table. See Fig. 5-5.
4. Unsolder the two leads connected to the brake solenoid.
5. Remove the two screws (PSW3x8) securing the solenoid stopper plate.
6. Remove the screws (PSW3x8) securing spring hooks A and E.
7. Remove the E ring shown in Fig. 5-15. Remove brake lever assembly A and spring hooks A and E together.
8. Remove the two screws (PSW3x8) securing the brake solenoid assembly.
9. Remove solenoid brackets A and B from the brake solenoid assembly as shown in Fig. 5-16. Remove the E ring from the solenoid pin and pull out the solenoid pin.

Replacement

10. Insert the solenoid pin into the plunger hole of the replacement solenoid and retain it with E ring.
11. Attach solenoid brackets A and B to the replacement solenoid with two PSW3x6 screws each. See Fig. 5-16.

– CAUTION –
If screws longer than the specified screws are used, the solenoid will be damaged.

12. Place the replacement solenoid so that the solenoid pin seats in the slot on brake lever assembly D behind the base plate and attach the solenoid with the two screws (PSW3x8).
13. Reinstall the removed parts by reversing steps 1 to 8.
14. Perform the four brake adjustments in turn in Section 5-2.

Fig. 5-15. Removal of brake solenoid

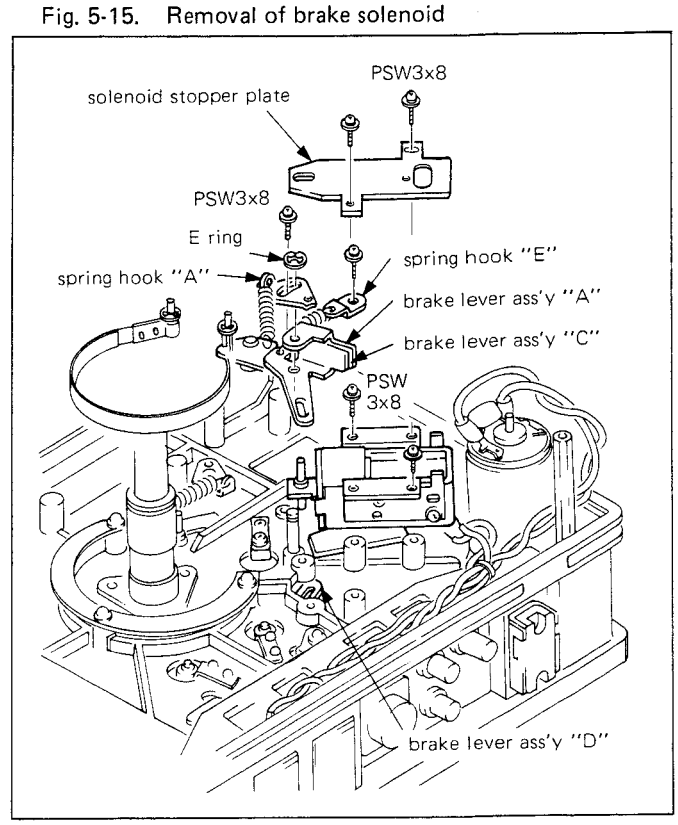
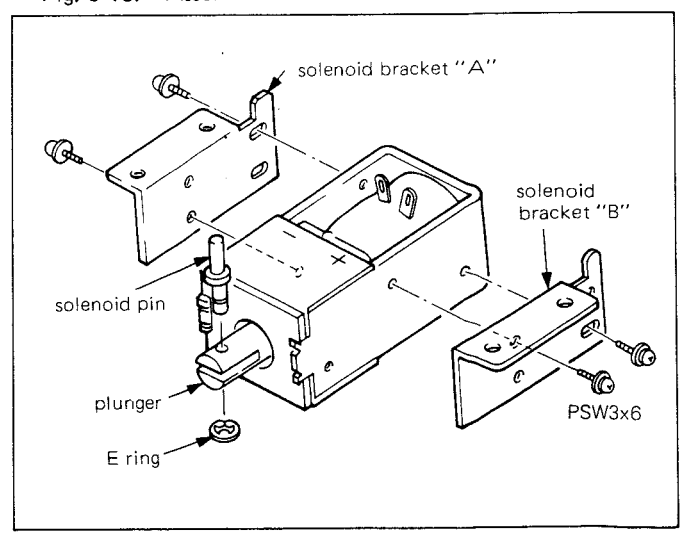


Fig. 5-16. Assemble of brake solenoid



SECTION 6
PARTS REPLACEMENT AND ADJUSTMENT OF TENSION SYSTEM

6-1. ADJUSTMENT OF AIR DAMPER

Preliminary Explanation

1. This adjustment must be done with the air damper mounted.
2. This adjustment must be made when the S tension arm or the air damper is replaced.
3. The air damper should be adjusted or replaced if the tape is so slack at the S tension arm when the REW mode is changed to the PLAY mode that the tape is damaged.

Adjustment Procedure

1. Remove the S and T guide panels, the drum panel, and the reel panel.
2. Remove the handle in Fig. 6-1 from the machine and place the machine upside down.
3. Remove the return spring shown in Fig. 6-2 and move the tension arm in the directions shown by the arrows in the figure several times.
4. Confirm that it takes 3.5 to 5 seconds for the S tension arm to drop from the position where the arm touches the sopper to the holizontal position. If necessary, adjust the adjusting screw.
5. Hook the return spring to the spring hook and attach the handle.

– NOTE –
Attach the handle so that the handle can be moved freely in the direction indicated by the arrow shown in Fig. 6-1.

6. Reinstall the removed panels.

Fig. 6-1. Removal of handle

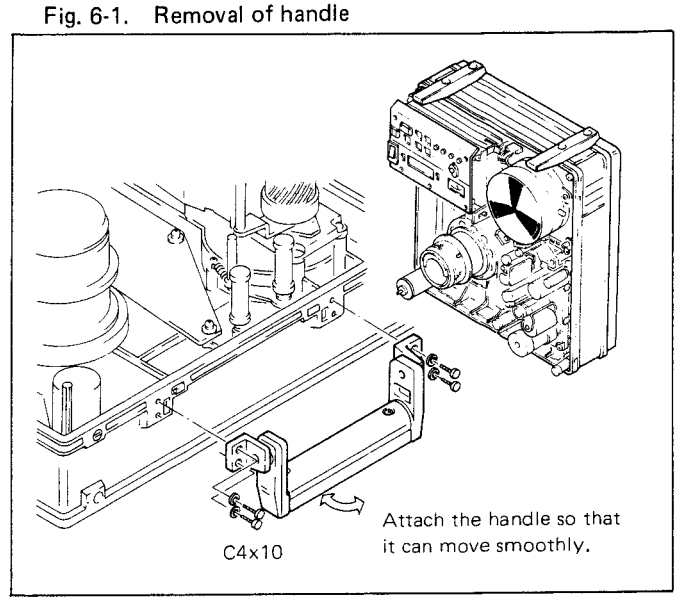


Fig. 6-2. Preparation for adjustment

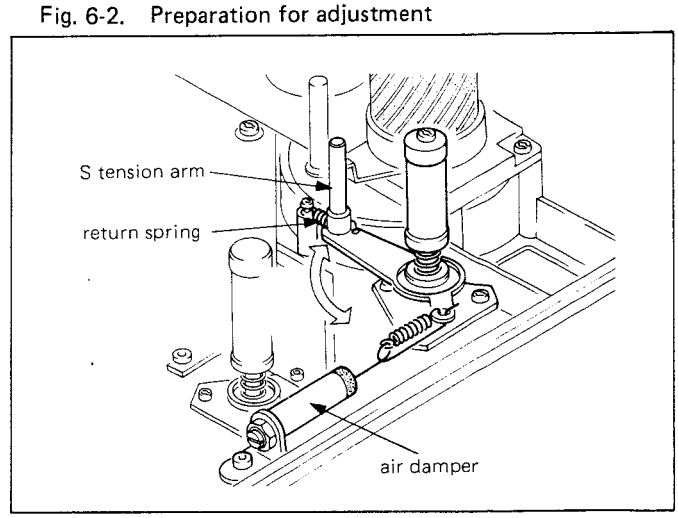
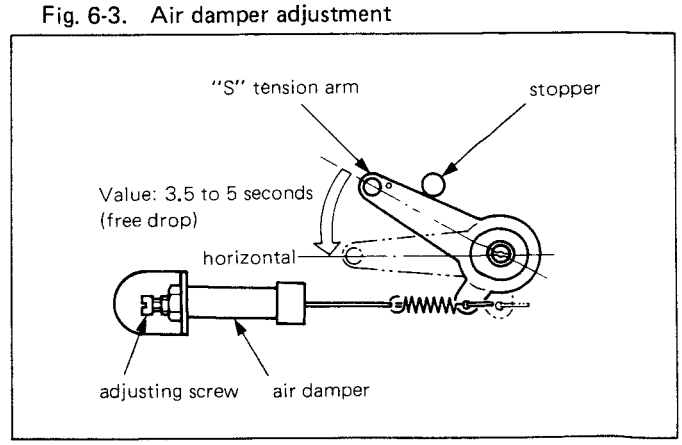


Fig. 6-3. Air damper adjustment



6-2. REPLACEMENT OF PHOTOCOUPLER FOR TAPE COUNTER

Preliminary Explanation

1. The photocoupler for the tape counter is in the counter roller assembly. As either of the following two different counter rollers may be used, follow the appropriate replacement procedure for the counter roller in your machine.
2. The CO-1 board must be attached correctly. If the board is attached incorrectly, the photocoupler will be damaged when the roller is rotated.
3. When the counter roller and the counter roller arm is replaced, refer to the following procedure.

Replacement Procedure

A. Replacement Procedure for Type 1 Counter Roller

1. Remove the two pan head screws (PS3x8) and the flat head screw (K3x8) attaching the counter roller assembly. See Fig. 6-5 Ⓐ.
2. Loosen the set-screw shown in Fig. 6-5 Ⓑ. Turn the upper flange counterclockwise and remove the CR lower flange assembly.
3. Remove the CO-1 board from the CR lower flange. See Fig. 6-5 Ⓒ.
4. Remove the two photocouplers from the CO-1 board. See Fig. 6-5 Ⓓ.
5. Cut the mounting flanges off the replacement photocoupler as shown in Fig. 6-6.
6. Solder two new photocouplers to the CO-1 board. See Fig. 6-5 Ⓓ.
7. Attach the CO-1 board on which the new photocouplers are soldered to the CR lower flange with two screws (B2.6x4). See Fig. 6-5 Ⓒ.
8. Assemble the counter roller by reversing the removal procedure.
9. Turn the counter roller by hand and confirm that the photocouplers do not touch the CR pulley. If you hear an abnormal sound caused by their touching, repeat steps 7 and 8 to adjust the position of the CO-1 board.

   – CAUTION –
   Turn the counter roller slowly and carefully, or the photocouplers will be damaged.

10. The tape running adjustment described in Section 9-2 should be done after the replacement of the photocoupler.

Fig. 6-4. Counter roller

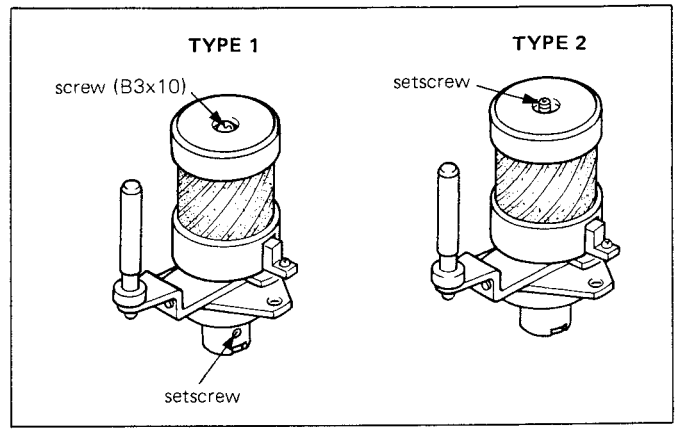


Fig. 6-5. Removal of type 1 counter roller

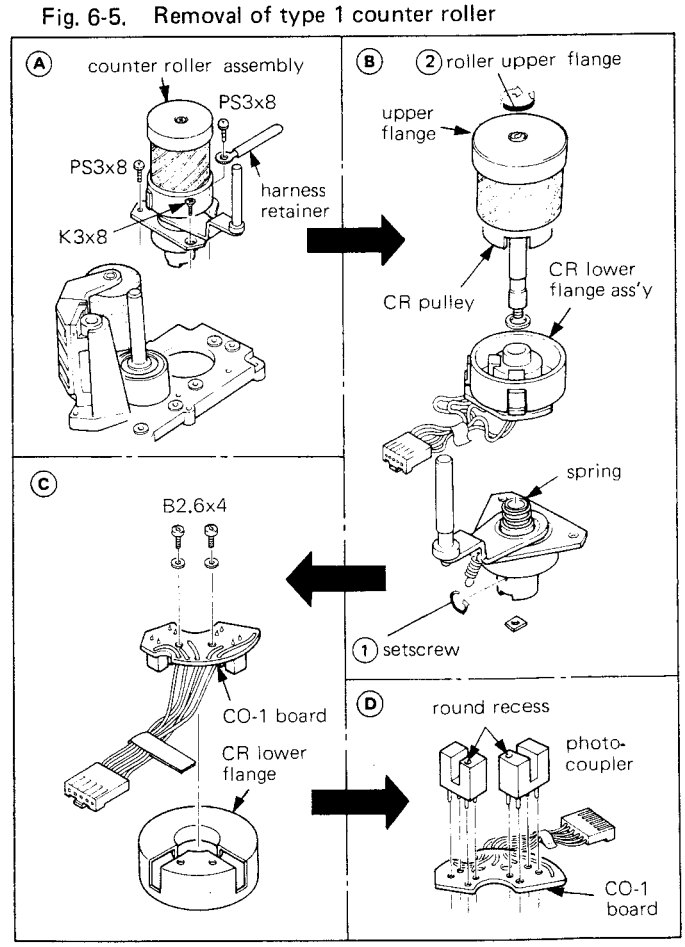
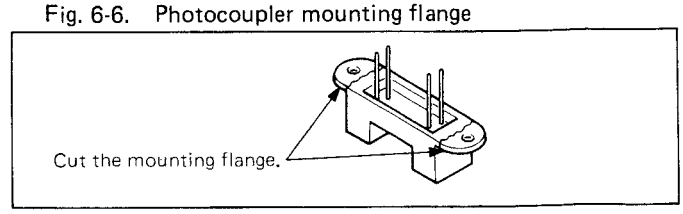


Fig. 6-6. Photocoupler mounting flange

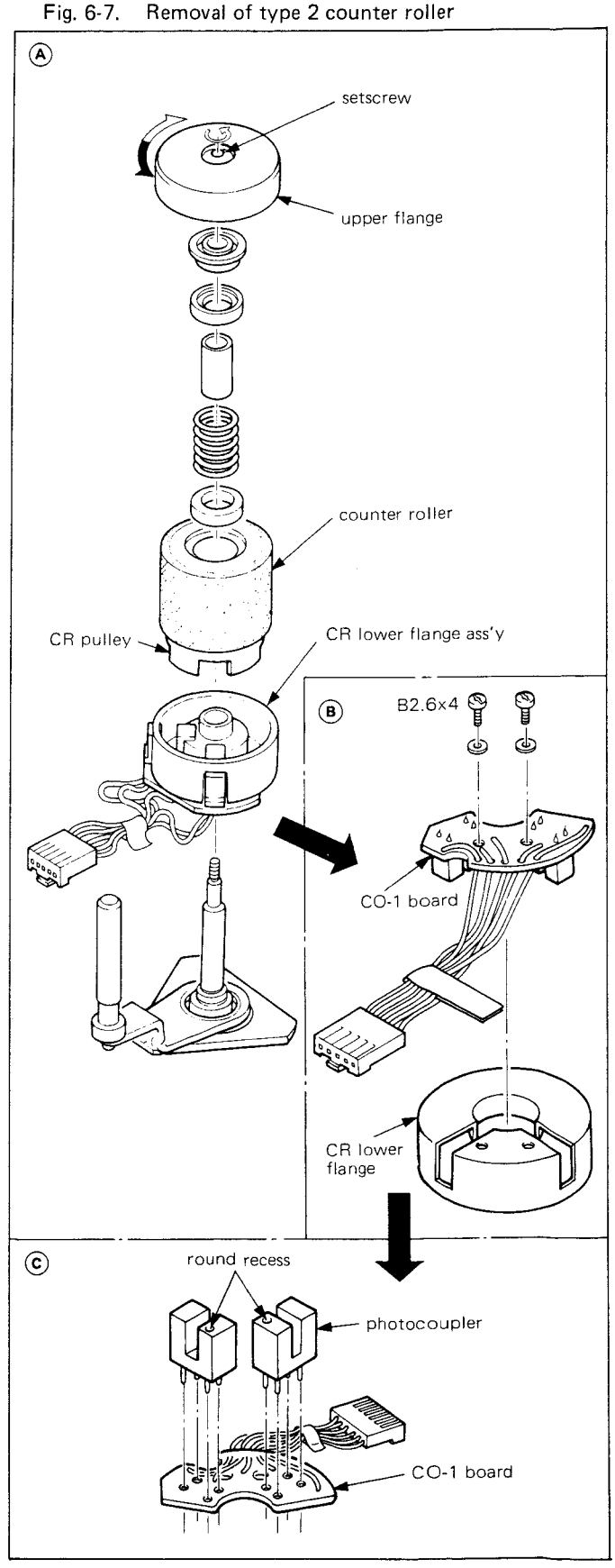


B. Replacement Procedure for Type 2 Counter roller

1. Loosen the set-screw shown in Fig. 6-7 Ⓐ . Turn the upper flange counterclockwise and remove it. Arrange the removed parts in the order shown.
2. Remove the CO-1 board from the CR lower flange assembly as shown in Fig. 6-7 Ⓑ .
3. Remove the two photocouplers from the CO-1 board as shown in Fig. 6-7 Ⓒ .
4. Cut the mounting flange of the replacement photocoupler as shown in Fig. 6-6.
5. Solder the two new photocouplers to the CO-1 board.
6. Attach the CO-1 board with the new photocouplers to the CR lower flange with two screws (B2.6x4). See Fig. 6-7 Ⓑ .
7. Reassemble the counter-roller referring Fig. 6-7 Ⓐ .
8. Turn the counter-roller by hand and confirm that the photo-couplers do not touch the CR pulley. If an abnormal sound is heard, repeat steps 6 and 7 to adjust the position of the CO-1 board.

   – CAUTION –
   Turn the counter roller carefully, or the photocouplers will be damaged.
9. The tape running adjustment described in Section 9-2 should be done after the photocoupler are replaced.

Fig. 6-7. Removal of type 2 counter roller



6-3. ABNORMAL FWD BACK TENSION AND ITS CORRECTION

Symptom

- If the tape tension is weak abnormally in the FWD mode
- If the tape tension varies when a shock is given to the machine so that the tape runs abnormally

Check and Countermeasure

1. Check the contacts of these connectors on SV-17 board.
   - CN62 (pin 3)
   - CN66 (pins 7 and 8)
   - CN165 (pins 1, 2 and 3)
2. Check looseness of the set-screws of the reel pulley and the reel motor pulley.
3. Check that the drive belt is installed correctly.

– NOTE –
If when a signal being supplied to INPUT VIDEO is turned off, the tape tension varies, check the crystal on the SL-4 board.

SECTION 7
PARTS REPLACEMENT AND ADJUSTMENT OF CAPSTAN SYSTEM

7-1. REPLACEMENT OF CAPSTAN ASSEMBLY

Preliminary Explanation

1. If the eccentricity of the capstan shaft becomes large (more than 5 μm), the audio wow flutter may be deteriorate.

– NOTE –

A defective capstan motor may be contribute to wow and flutter.

2. Check the slant of the pinch roller whenever the capstan assebmly is replaced and adjust the slant, if necessary. Then check the tape's running, referring to Section 9-2.

Replacement Procedure

Removal

1. Remove the S and T guide covers, the drum panel and the reel panel.
2. Remove the five screws (B3x8) securing the bottom.
3. Remove the screws (PSW3x8) securing the SV-17 board. Remove the support screws securing the audio shield plate and the AU-10 board.
4. Remove the three screws (PSW3x6) securing the flywheel shield plate. See Fig. 7-1 Ⓐ.
5. Remove the drive belt as shown in Fig. 7-1 Ⓑ.
6. Remove the two screws (PSW3x8) securing the CA-6 board and remove the two leads from the relay board of the capstan assembly. See Fig. 7-1 Ⓒ.
7. Remove the three screws securing the capstan assembly as shown in Fig. 7-1 Ⓓ.
8. Solder the two leads to the replacement capstan assembly, referring to Fig. 7-1 Ⓒ. Secure the capstan assembly with the three screws (PS3x10) so that the relay board is in the position shown in Fig. 7-1 Ⓓ.

– CAUTION –

Be careful not to strike the capstan shaft with the base plate or something like that.

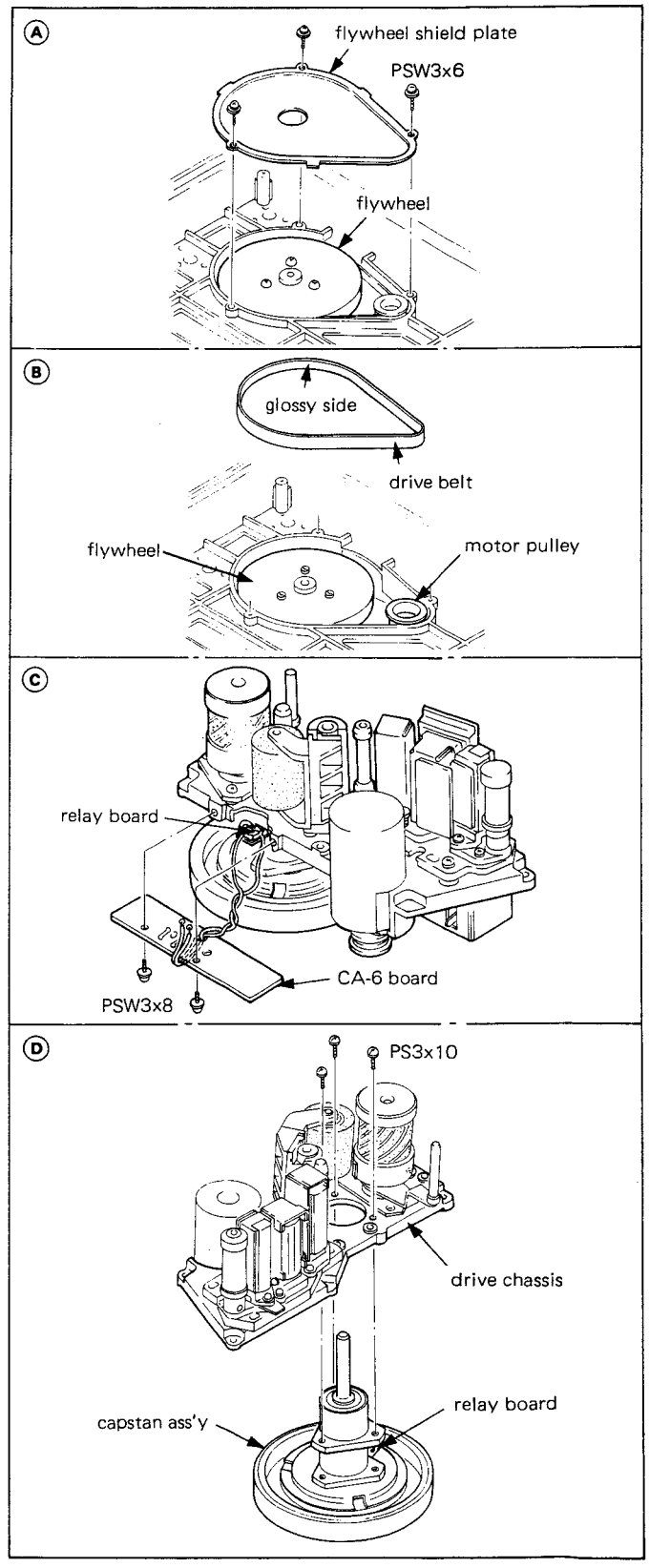
9. Install the drive belt on the flywheel and the motor pulley so that its glossy side is inside.
10. Attach the flywheel shield plate with the three screws (PS3x6).
11. Solder the two leads from the relay board to the CA-6 board. See Fig. 7-1 Ⓒ.

– CAUTION –

Be careful not to contact the leads with the flywheel.

12. Attach the rest of the removed parts.

Fig. 7-1. Replacement of capstan assembly



7-2. REPLACEMENT OF CAPSTAN MOTOR

– NOTE –

A defective capstan motor may cause unacceptable wow and flatter.

Replacement Procedure

Removal

1. Remove the parts, following steps 1 to 5 of Section 7-1 Replacement of Capstan Assembly.
2. Loosen the two set-screws shown in Fig. 7-2 Ⓐ. Remove the flywheel, the nylon washer, the compression spring, and the spacer.
3. Loosen the two set-screws shown in Fig. 7-2 Ⓑ. and remove the motor pulley.
4. Unsolder the motor wirings and remove the four screws (C2x8) securing the capstan motor. See Fig. 7-2 Ⓒ.
5. Remove the motor shield case and the rubber sheet from the capstan motor. See Fig. 7-2 Ⓓ.

Assembly

6. Place the rubber sheet at the position of the replacement motor shown in Fig. 7-2 Ⓓ, install the motor shield case, and fix the case with the two set-screws.
7. Attach the replacement capstan motor to the drive chassis with the flat washers, the spring washers, and the four screws (C2x8).
8. Install the motor pulley removed in step 3 on the motor shaft as shown in Fig. 7-3.
9. Solder the leads to the terminals of the capstan motor. Yellow lead to ⊕ and blue lead 50 ⊖.

Fig. 7-2. Removal of capstan motor

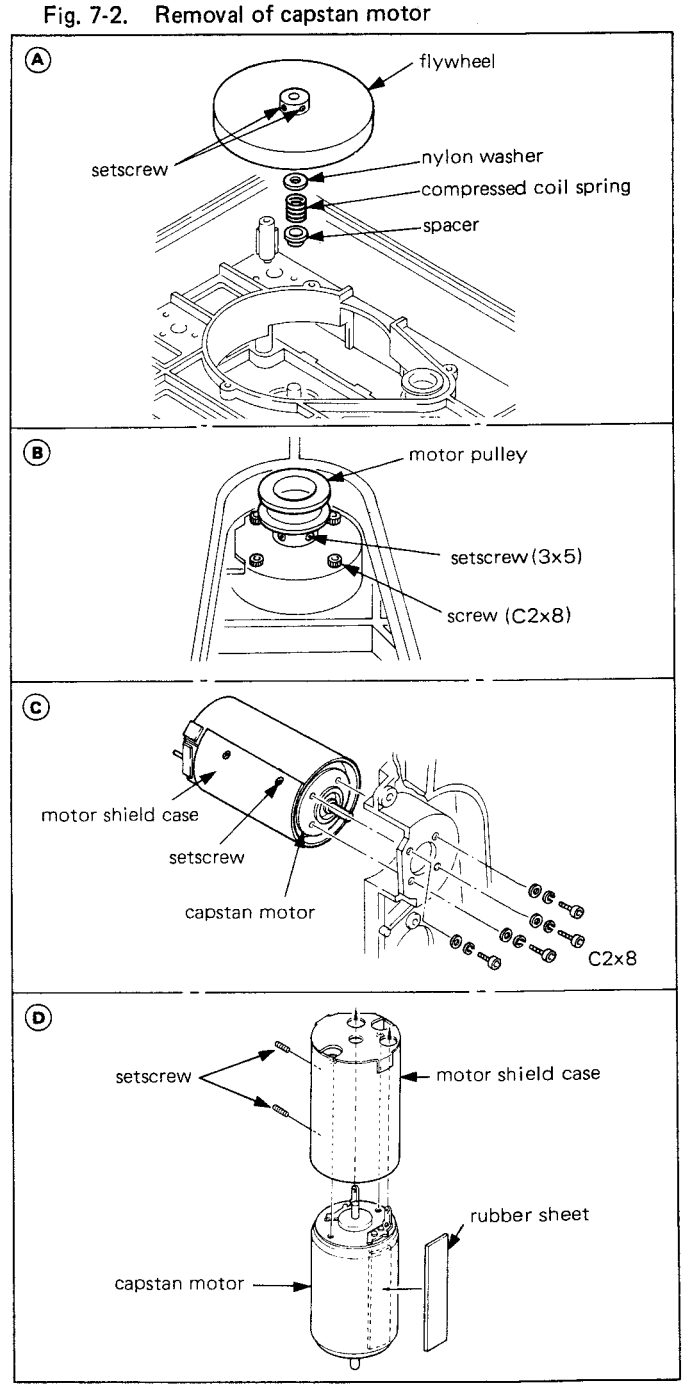
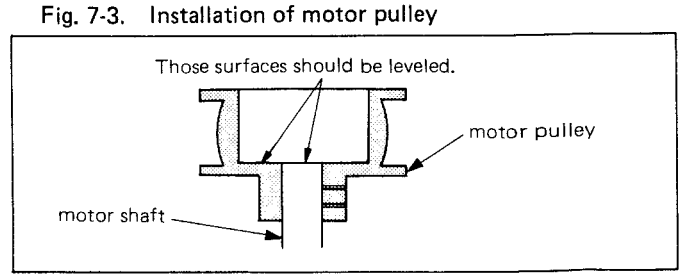


Fig. 7-3. Installation of motor pulley

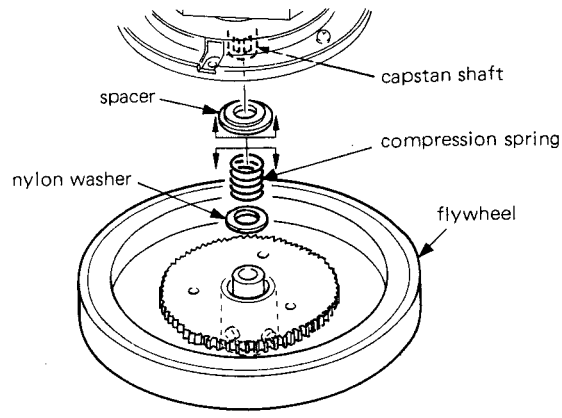


10. Install the nylon washer and the compression spring on the boss at the center of the flywheel. Then, holding the spacer to the capstan shaft. Fit the flywheel to the capstan shaft assembly, and push it in until it stops. Tighten the two set-screws.

11. Install the drive belt on the flywheel and the motor pulley so that its glossy surface is inside.

12. Attach the flywheel shield plate and other components.

Fig. 7-4. Installation of flywheel



– NOTE –
A nylon washer is not used with a brass flywheel.

7-3. ADJUSTMENT OF PINCH ROLLER

Preliminary Explanation

1. The pinch roller has an important rolls in the tape running, especially as far as tape speed, tape tension, and the prevention of tape curl go.

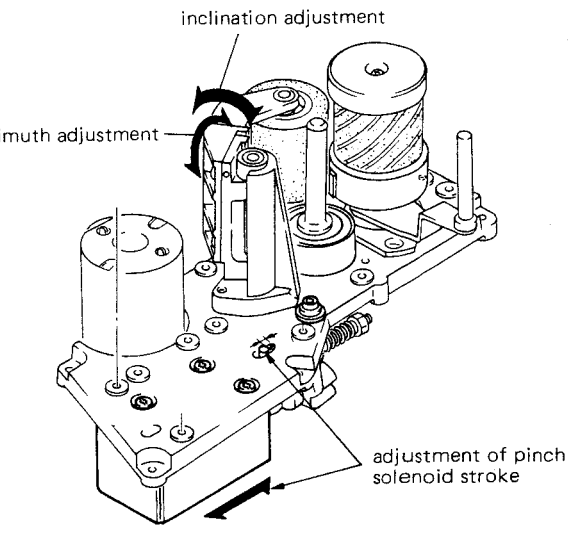
2. The total pinch roller adjustment consists of the following sub-adjustments. Perform necessary sub-adjustment in this order.

   (1) Pinch Solenoid Stroke Adjustment (7-3-1):
   The plunger stroke of the pinch solenoid is adjusted. If this adjustment is insufficient, the following will result.
   – The pinch plunger is not energized.
   – The tape speed is slow or the tape does not run.
   – The tape tension is abnormal.

   (2) Pinch Roller Slantness Adjustment (7-3-2):
   The slant of the pinch roller against the capstan shaft is adjusted.
   - This adjustment is in parts:
     ① Azimuth Adjustment
     ② Inclination Adjustment
   - If the pinch roller slant is incorrect, the tension on the top of the tape is different from the tension on the bottom and the tape will curl.
   - The following jig (flat plate) is necessary to make this adjustment.

   J-2 SONY Part No. J-604-016-0A

Fig. 7-5. Adjustment of pinch roller



(3) Pinch Roller Pressure Adjustment (7-3-3):
- If this pressure is incorrect, the following troubles may occur:
  - Abnormally large wow and flutter
  - Abnormally slow tape speed
  - Fluctuation of tape speed
- A 5 kg, zero point adjustable type tension scale is necessary to make this adjustment.

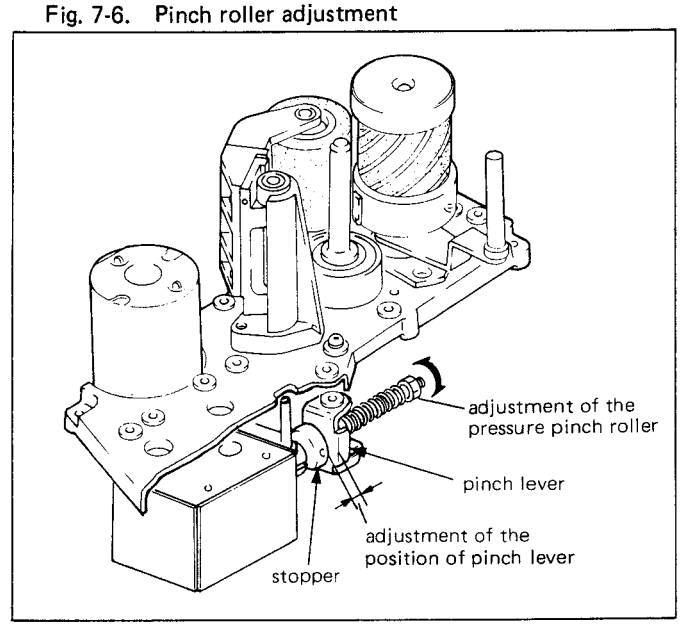
J-5 SONY Part No. J-604-164-0A

(4) Pinch Lever Position Adjustment (7-3-4):
The clearance is adjusted between the stopper and the pinch lever shown in Fig. 7-6 when the pinch roller is pressed to the capstan shaft.
- If this clearance is incorrect, the following trouble is caused.
  ⟶ The pinch roller does not function.
- The thickness gauge is necessary to this adjustment.

J-8 SONY Part No. J-604-167-0A

3. Check the tape's running referring to Section 9-2 after the adjustment of the pinch roller and, if necessary, check the tape tension and the tape speed.
4. This adjustment should be performed after the pinch roller, the pinch solenoid, or the capstan shaft assembly has been replaced.
5. Remove the S and T guide covers, the drum panel, and the reel panel before making these adjustments.

Fig. 7-6. Pinch roller adjustment

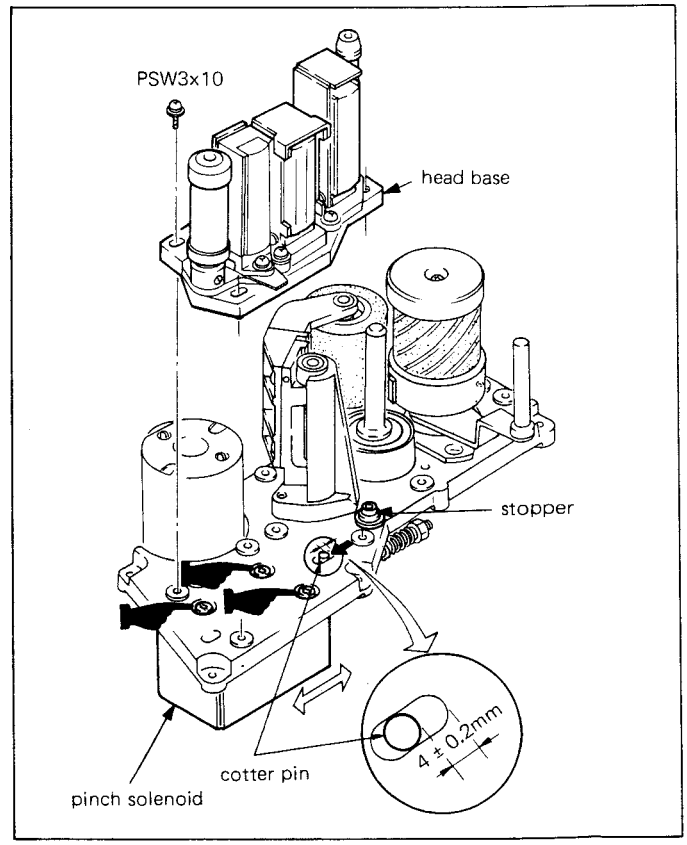


7-3-1. Pinch Solenoid Stroke Adjustment

Adjustment Procedure

1. Remove the head base as shown in Fig. 7-7.
2. Set up the energized state of the pinch solenoid and confirm that the clearance between the end of the slot and the cotter pin of the pinch plunger is $4.0^{\pm 0.2}$ mm as shown in Fig. 7-7. If the clearance does not satisfy this value, loosen the three screws marked by ☛ in Fig. 7-7 and adjust the position of the pinch solenoid to satisfy the value.
3. Secure the head base with the four screws (PSW3x10) while holding it against the stopper.
4. Check the position of the CTL head, the PG phase, and height and azimuth of the audio head, referring to Sections 9-7 and 9-8. If the PG phase is adjusted, adjust the over lap, too.

Fig. 7-7. Stroke adjustment of pinch solenoid



7-3-2. Pinch Roller Slant Adjustment

Azimuth Adjustment

1. Place the jig (flat plate) on the capstan shaft and the pinch roller as shown in Fig. 7-8 (A) slightly. Press down on the jig so that it makes full contact with the capstan shaft. Check to see that the clearance between the pinch roller and the jig is not more than 0.15 mm. If this condition is not met, adjust as follows.
2. Loosen the two screws (C3x8) shown in Fig. 7-8 (B) . Screw the adjusting screw (M2.6x10) into the tapped hole shown in the figure and adjust the azimuth. When movement in the opposite direction is necessary, move the PR lever in the direction indicated by arrow "B" and adjust the adjusting screw while returning the PR lever in the direction shown by arrow "A".
3. Remove the adjusting screw and tighten other two screws.

Inclination Adjustment

1. Hold the pinch roller to the capstan shaft with your hand. Confirm that the clearance between the capstan shaft and the pinch roller is less than 0.02 mm when the top of the pinch roller is in contact with the capstan shaft. If this value is not satisfied, adjust as follows.
2. Loosen the two screws (C3x8) shown in Fig. 7-9 (B) . Adjust the inclination of the pinch roller by turning the two adj. screws as necessary.
3. Remove the two adjusting screws (B3x6) and tighten the other two screws.

Fig. 7-8. Azimuth adjustment

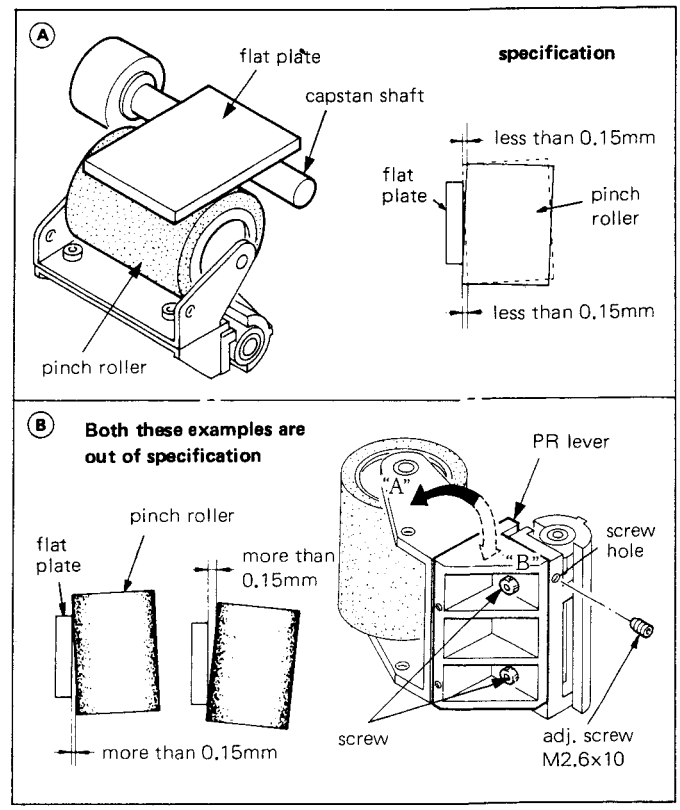
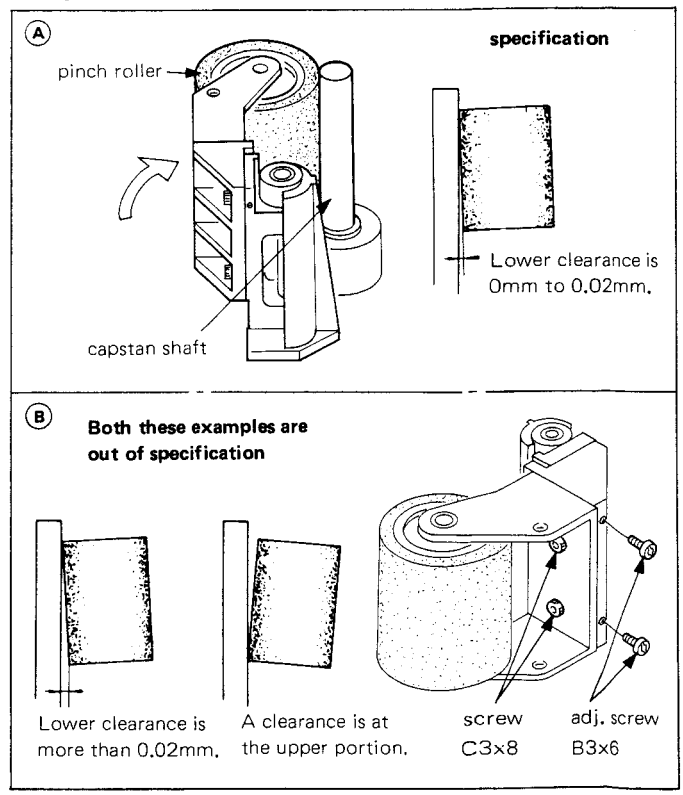


Fig. 7-9. Inclination adjustment



7-3-3. Pinch Roller Pressure Adjustment

Adjustment Procedure

1. Hold the 5 kg tension scale horizontally and adjust the adjusting screw so that the needle points to zero.
2. Place the machine horizontally and set up the energized state of the pinch solenoid. Tie a piece of a strong string to the holes on the pinch roller arm as shown in Fig. 7-11 and Hook the tension scale to the string. Pull the tension scale in the direction shown in the figure so that the pinch roller is slightly apart from the capstan shaft. Return the pinch roller to the capstan shaft while turning the pinch roller by hand. Confirm that the scale reading satisfies the value below at the moment the pinch roller touches the capstan and the turning of the pinch roller becomes a little harder.

   Value: 4.0 to 4.2 kg

   If the reading is out of the specified value, adjust the pinch roller pressure as follows.
3. The pressure can be adjusted by turning the adjustment nut shown in Fig. 7-12.
   - Too strong pressure force
     →Turn the nut counterclockwise.
   - Too weak pressure force
     →Turn the nut clockwise.

– NOTE –
The pressure changes about 0.7 kg each turn of the nut.

Fig. 7-10. Calibration of tension scale

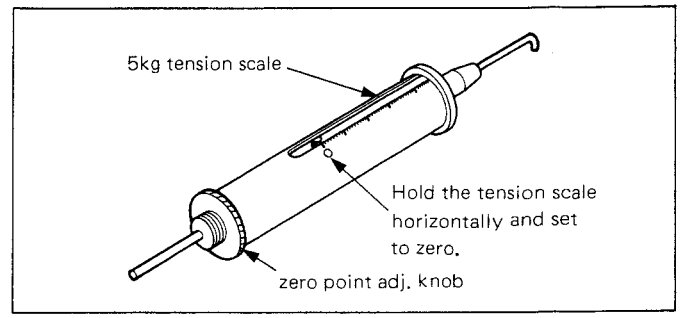


Fig. 7-11. Measurement of pinch roller pressure

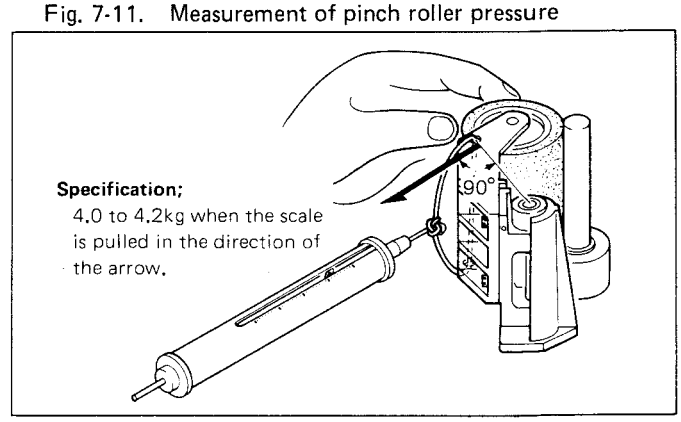
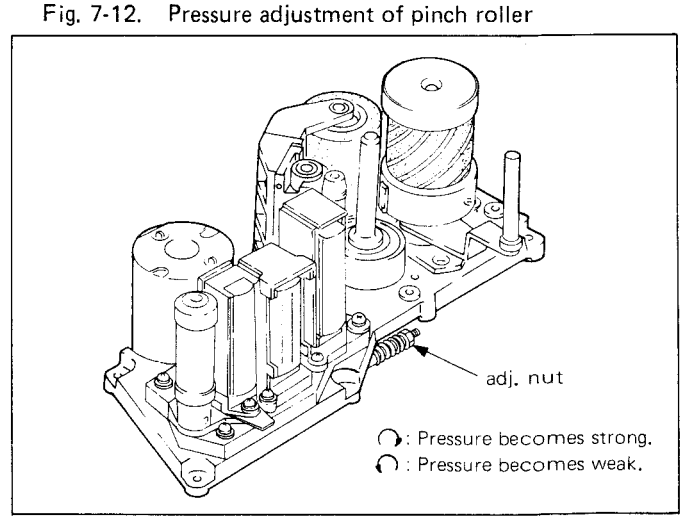


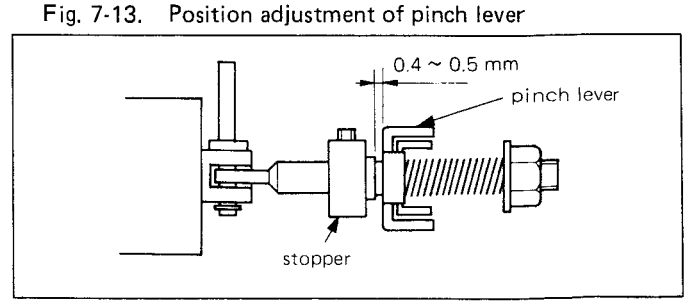
Fig. 7-12. Pressure adjustment of pinch roller



7-3-4. Pinch Lever Position Adjustment

1. Set up the energized state of the pinch plunger.
2. Measure the interval between the pinch lever and the stopper as shown in Fig. 7-13 with a thickness gauge. Confirm that the interval is 0.4 to 0.5 mm. If not, adjust the position of the stopper as follows.
3. Loosen the set-screw securing the stopper and insert the 0.45 mm thickness gauge between the pinch lever and the stopper. Tighten the set-screw while pushing the stopper toward the pinch lever.

Fig. 7-13. Position adjustment of pinch lever



SECTION 8
PARTS REPLACEMENT AND ADJUSTMENT OF DRUM SYSTEM

8-1. REPLACEMENT OF UPPER DRUM ASSEMBLY

Preliminary Explanation

1. We recommend replacing the upper drum assembly when the video and/or sync head projects less than 50 μm, because the head will not be able to be used soon.

– NOTE –

Section 4-8 tells how to measure the projection of the heads.

2. If either of the video head, the sync head, or the rotary erase head has to be replaced, the entire upper drum assembly will have to be replaced because a head cannot be replaced individually.

3. The following two jigs are required to replace the upper drum assembly:

Name (Ref. No.)	SONY Part No.
Tapered screw (J-3)	J-604-046-0A
Eccentricity adjustment jig (J-1)	J-604-075-0B

– NOTE –

The tapered screws are used to temporarily hold the upper drum assembly to the lower drum assembly. The center line of the upper drum assembly will be precisely aligned with the one of the lower drum assembly by temporarily holding. Therefore the PG phase adjustment is easy to do.

4. Be careful while replacing the new parts because the upper drum assembly is easily damaged. Especially be careful not to hit the rotary heads on the slant guides.

5. Perform the necessary adjustments after replacing the upper drum assembly, following the flowchart in Section 9-1-2.

Replacement Procedure

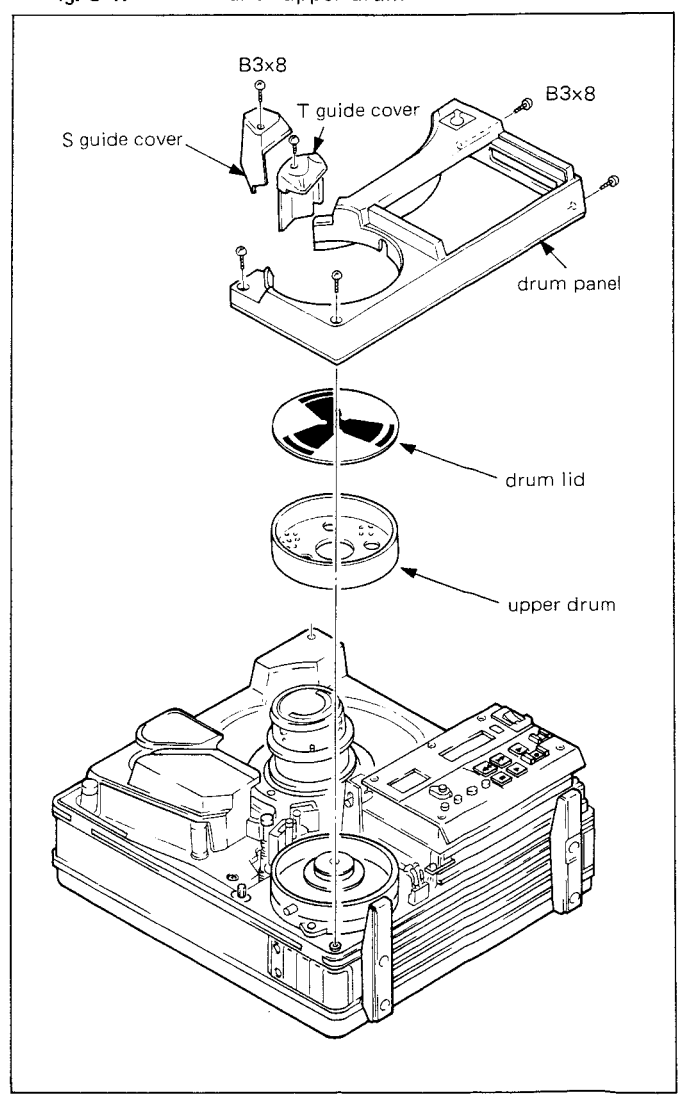
Removal

1. Remove the S guide cover, the T guide cover, the drum panel and the drum lid as shown in Fig. 8-1.

2. Unsolder the six leads of the video head, the sync head, and the rotary erase head of the DU-5 board.

3. Remove the two cap screws (M4x10) fixing the upper drum.

Fig. 8-1. Removal of upper drum



Cleaning

4. Clean the following sections with a piece of cloth moistened with cleaning fluid.
   - Flange surface of the head drum assembly
   - Surface on the replacement upper drum assembly which will come into contact with flange
   - The slant guide base and the surface of the lower drum which is adjacent to the slant guide base
   - The guide posts and the guide flanges

Replacement of Upper Drum

5. Place the upper drum assembly on the flange of the lower drum so that the lead colors of the assembly correspond to those of the DU-5 board. Thread the two tapered screws (J-3) into the tapped holes and tighten them alternately to hold the upper drum assembly in place.

   – CAUTION –
   - **If there was a spacer between the former upper drum assembly and the flange, place that spacer on the flange before installing the replacement upper drum assembly.**
   - **Do not turn the upper drum assembly after it is fastened down with the tapered screws because the tips of the tapered screws might strike the PG coil.**

6. Remove the tapered screw near the video head and reduce with a cap screw (M4x10) with flat washer and spring washer temporarily. See Fig. 8-4. Remove the other tapered screw and replace with temporarily tightened cap screw, flat washer and spring washer.

Fig. 8-2. Cleaning

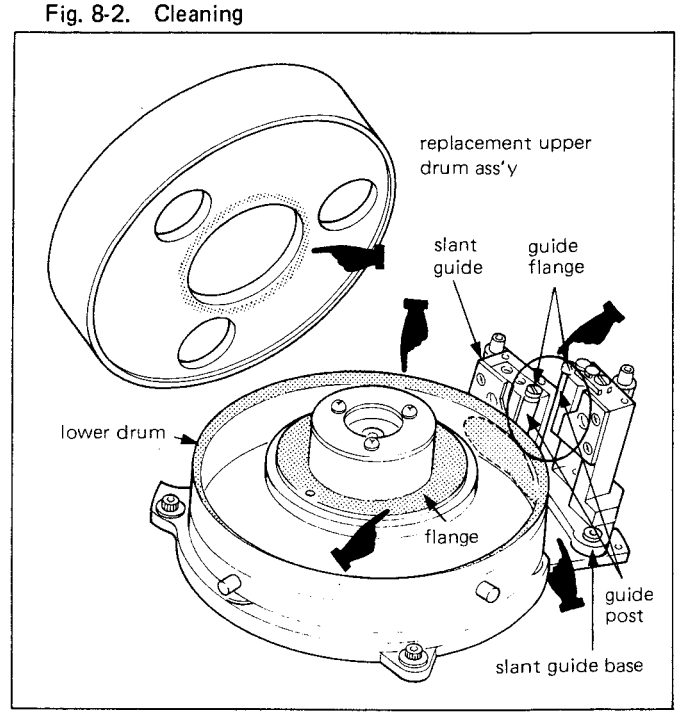


Fig. 8-3. Replacement of upper drum

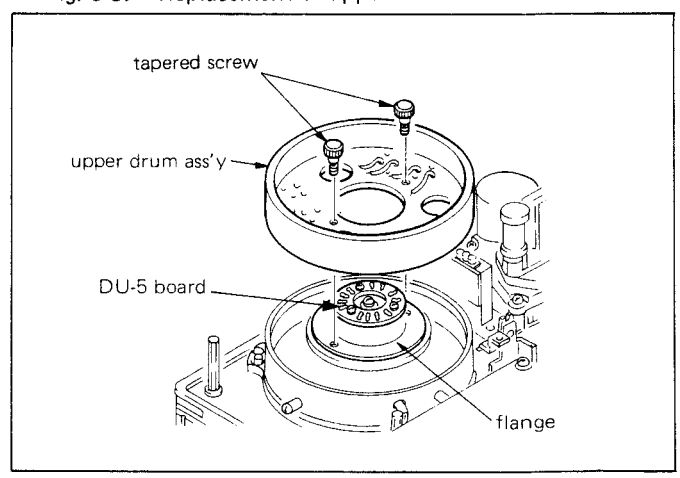
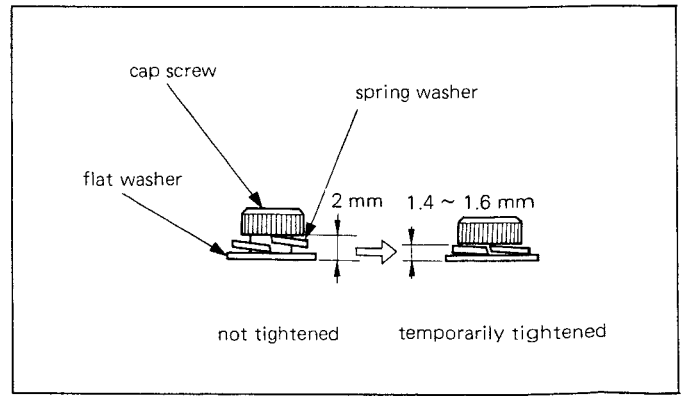


Fig. 8-4. Temporary tightening of cap screw



Adjustment of Upper Drum Eccentricity

7. Confirm that the tip of the probe of the dial gauge is at the center of the white plastic pin inserted in the measurement arm as shown in Fig. 8-5. If the tip is not at the center, bend the probe of the dial gauge in the direction of the arrows.

8. Turn the zero point adjusting screw of the jig fully counter-clockwise.

9. Fix the jig to the tapped hole on the drum base for mounting the jig while holding the stopper of the jig to the lower drum.

10. Turn the jig in the direction shown by arrow (A) in Fig. 8-6. Pull the jig up in the direction shown by arrow (B) until it stops, then turn the jig slowly back toward the drum.

11. Adjust the zero point adjusting screw so that the needle of the dial gauge points to zero.

12. Rotate the upper drum clockwise slowly and confirm that the needle swing of the dial gauge during a drum rotation is always within 5 μm. If the needle shows a value over 5 μm, adjust as follows:
    (1) Find the position where the needle indicates the maximum value.
    (2) Stop the upper drum at that position and tap the inside of the upper drum opposite to the jig with the handle of a screwdriver until the value is about 1/3 of the maximum value.
    (3) Rotate the upper drum again by hand to find the position where the needle now indicates the maximum value, and repeat step (2). Repeat steps (2) and (3) until the needle is within 5 μm during a complete revolution.

13. Tighten the two cap screws alternately after the eccentricity adjustment to secure the upper drum securely. Confirm again that the eccentricity is within 5 μm.

Fig. 8-5. Adjustment of eccentricity adjustment jig

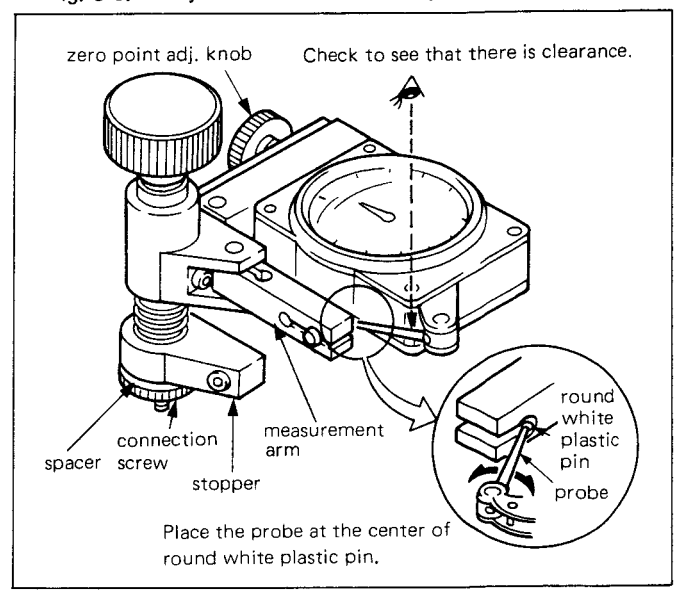


Fig. 8-6. Height setting of jig

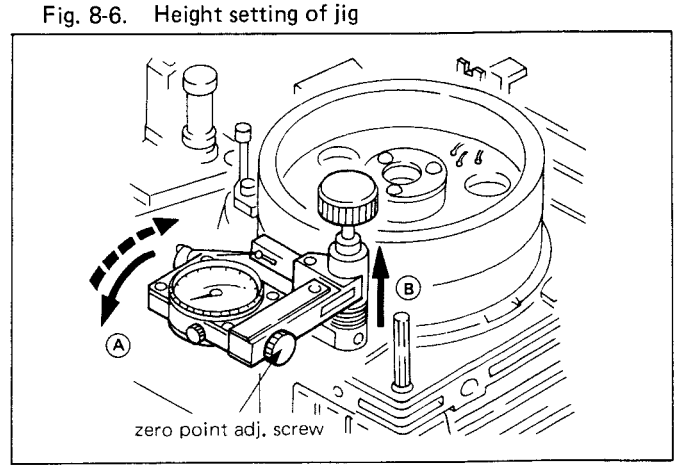
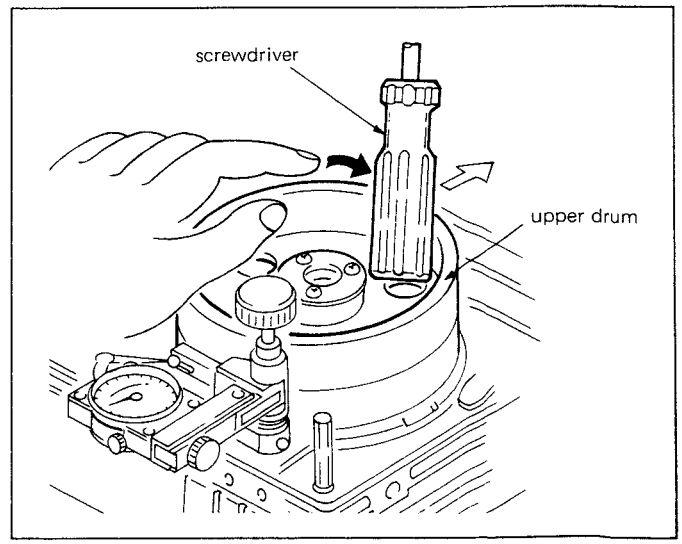


Fig. 8-7. Adjustment of upper drum eccentricity



Assembly

14. Solder the six leads from the video head, the sync head, and the rotary erase head to the DU-5 board. See Fig. 8-8.

15. Position the drum lid so that the triangle symbols with no head name next to them are directly over the dummy heads – heads which have no wires connecting to the DU-5 board and so that the heads of the three cap screws securing the DU-5 board enter the three holes on the underside of the drum lid shown in Fig. 8-9.

16. Confirm that the drum lid cannot turn by holding the upper drum and trying to turn the lid. Secure the drum lid with the screw (B3x8).

– NOTE –

There must be no clearance between the drum lid and the upper drum.

Fig. 8-8. Soldering of head leads

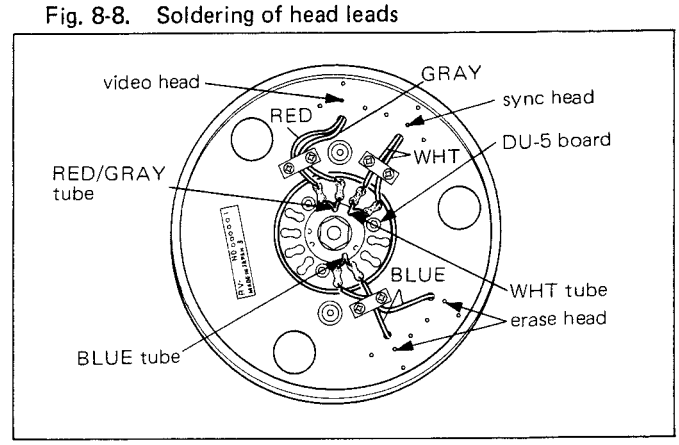
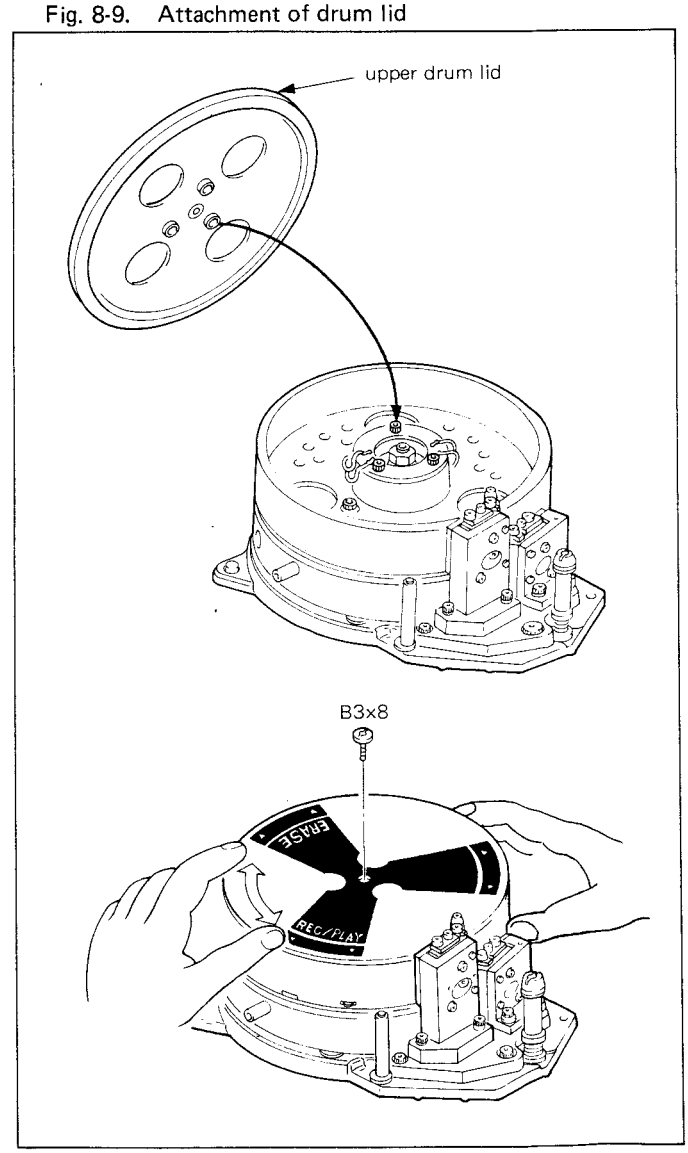


Fig. 8-9. Attachment of drum lid



8-2. REPLACEMENT OF HEAD DRUM ASSEMBLY

Preliminary Explanation

1. If the RF waveform varies excessively even after the tracking adjustment (Section 9-5), replace the head drum assembly.
2. We recommend replacing the head drum assembly every 2000 operating hours or every two years.
3. Perform adjustments after replacing the head drum, following the flowchart in Section 9-1-1.

Replacement Procedure

Removal

1. Remove the S guide cover, the T guide cover, the drum panel, and the reel panel as shown in Fig. 8-10.
2. Pull connector CN99 of the drum out of the DU-6 board. Pull CN98 and CN99 out of the DU-4 board.
3. Remove the three screws (M4x12) securing the drum base to the base plate.
4. Place the head drum assembly on a piece of soft cloth so that the upper side of the drum assembly is down, as shown in Fig. 8-11. Remove the three screws (M4x12) fixing the drum base.

Fig. 8-10. Removal of head drum assembly

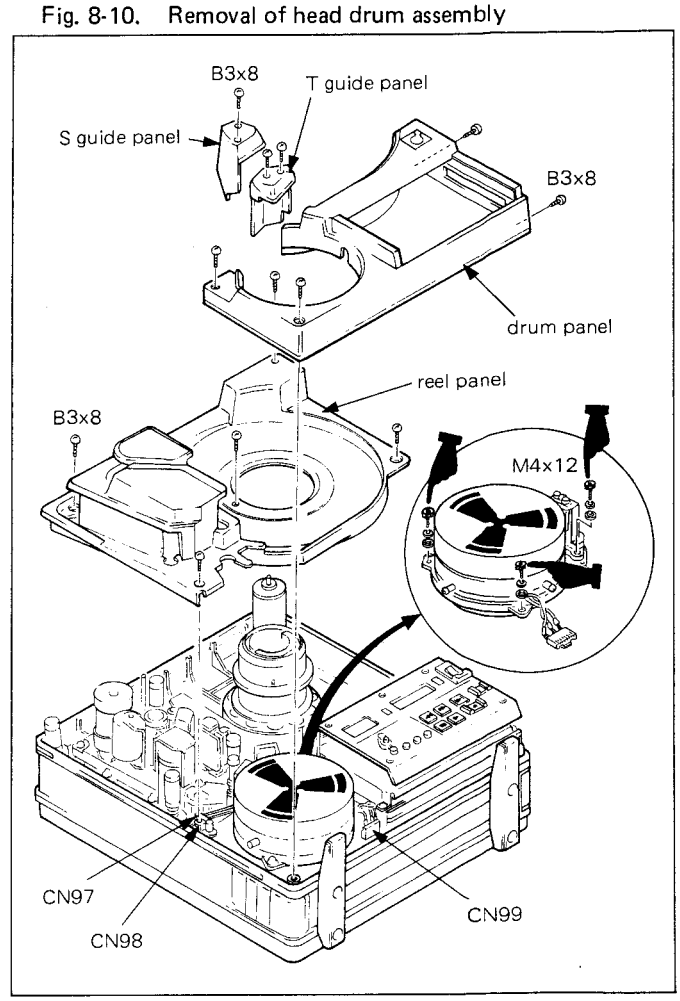
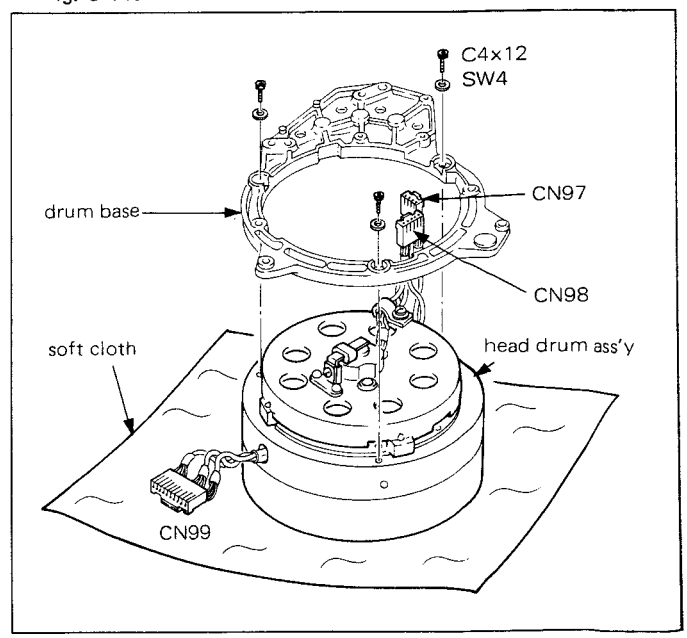


Fig. 8-11. Removal of drum base



Cleaning

5. Clean the slant guide posts, the S and T guide brackets, and their guide flange. See Fig. 8-12.

Replacement

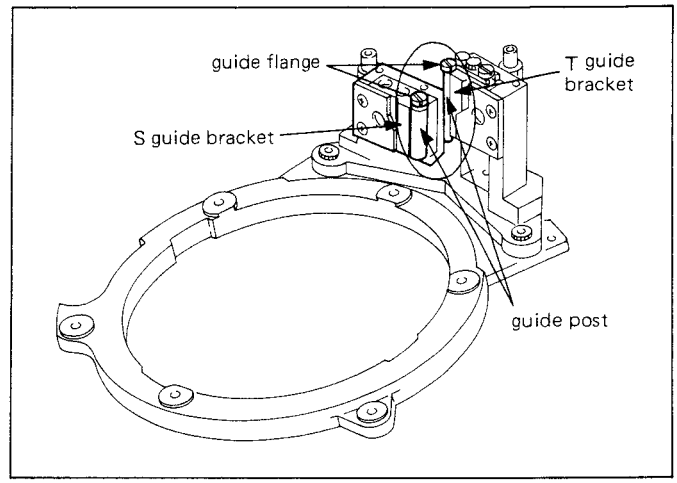
6. Place the replacement head drum assembly on a piece of soft cloth so that the upper drum side is down. Secure the head drum base with the three screws (M4x12) after passing connectors CN98 and CN99 through the drum base as shown in Fig. 8-11.

7. Secure the replacement head drum assembly with the drum base to the base plate by reversing the procedure in step 3.

   – CAUTION –
   Be sure not to hit the upper drum and the rotary head against the slant guide.

8. Connect the connectors and attach the panels, reversing the procedures in steps 1 and 2.

Fig. 8-12. Cleaning of slant guide



SONY

PORTABLE VIDEOCORDER

BVH-500
BVH-500PS
BVH-500PM

SUPPLEMENT-5

INFORMATION TO SERVICE ENGINEER

Please file this supplement on your first or second edition manual.

OPERATION AND MAINTENANCE MANUAL

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Sony Corporation

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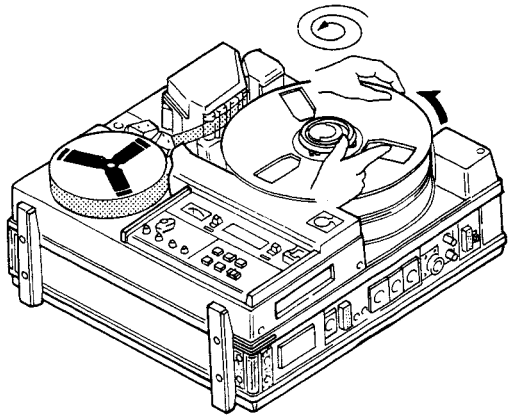
SECTION 2
INFORMATION TO SERVICE ENGINEER

2-1. GENERAL COMMENT

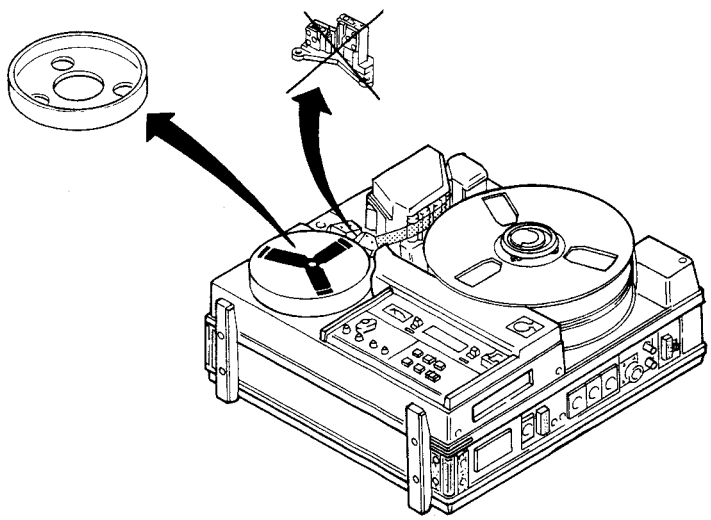
1. To wind a tape around the take-up reel:



Wind the tape two or three turns around the take-up reel, being careful not to fold over the end of the tape.

– NOTE –
If the end of the tape is folded over, the tape may catch between the slant guide and the upper drum.

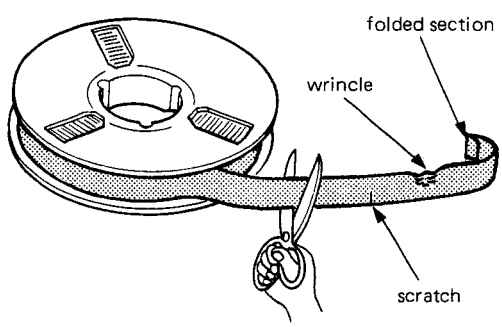
2. What to do the tape catches between the slant guide and the upper drum:



Remove the upper drum (not the slant guide assembly), then remove the tape.

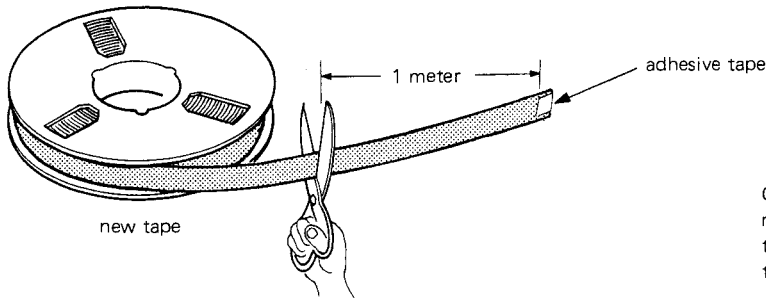
– NOTE –
After reinstalling the upper drum, perform the checks and adjustments in the flow-chart in Section 9-1-3.

3. To eliminate wrinkles and scratches on the tape:



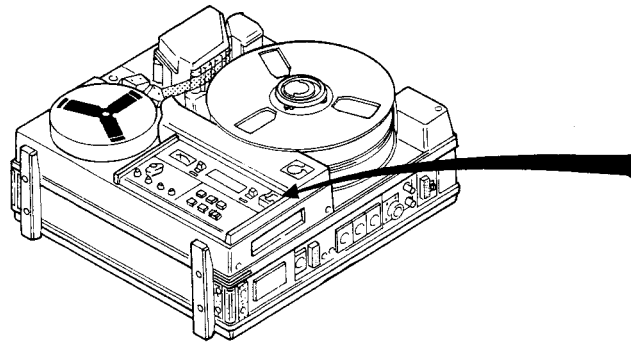
Cut off any tape which is wrinkled or scratches on it.

4. When using a new tape for the first time:



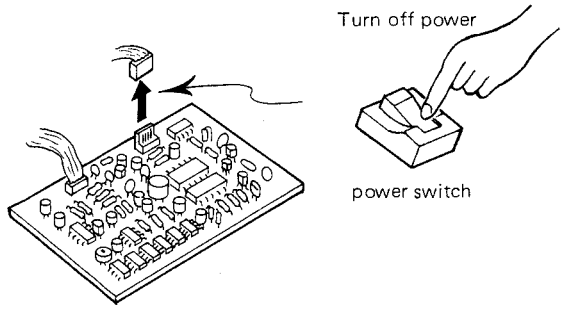
Cut off about one meter (40 inches) of the new tape or the new alignment tape so that there is no chance that the adhesive put on the end of the tape will clog the head.

5. While the tape is running:



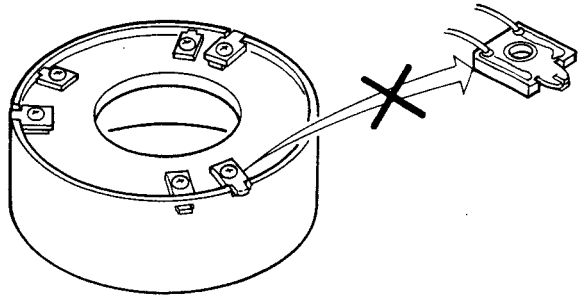
Do not turn off the power while the tape is running in the F. FWD or REW mode. Only turn off the power after setting the machine in the STOP mode. Especially if the AC code is pulled out, or if the power source is changed from AC to DC, the tape may be abnormally slacked and caught between the slant guide and the upper drum.

6. When inserting or removing a connector:



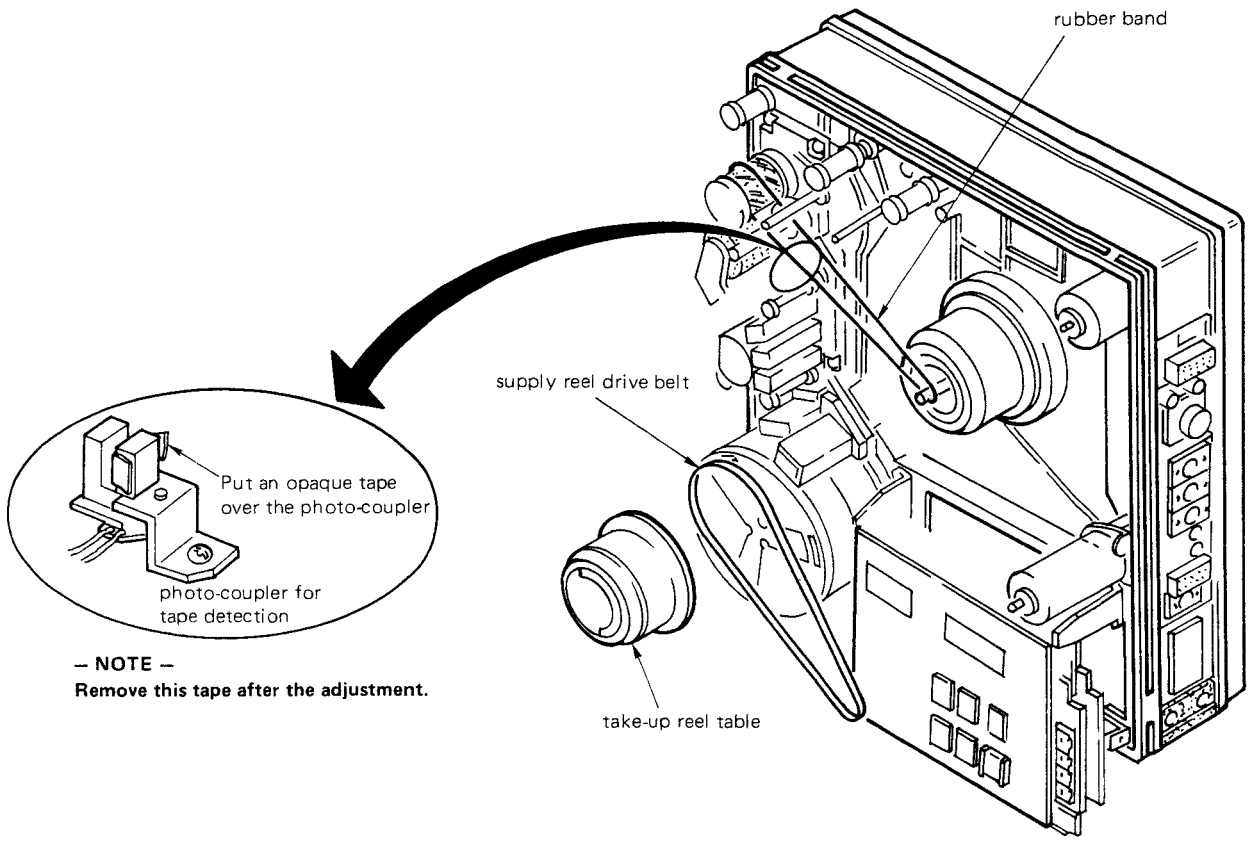
Be sure to turn off the power before inserting or removing a connector.

7. When replacing the upper drum assembly:



A single head on the upper drum cannot be replaced by itself, even if it is the only head that needs replacement. Replace the whole upper drum assembly in such a case, referring to Section 8-1.

8. To set the machine in the PLAY mode without threading a tape:



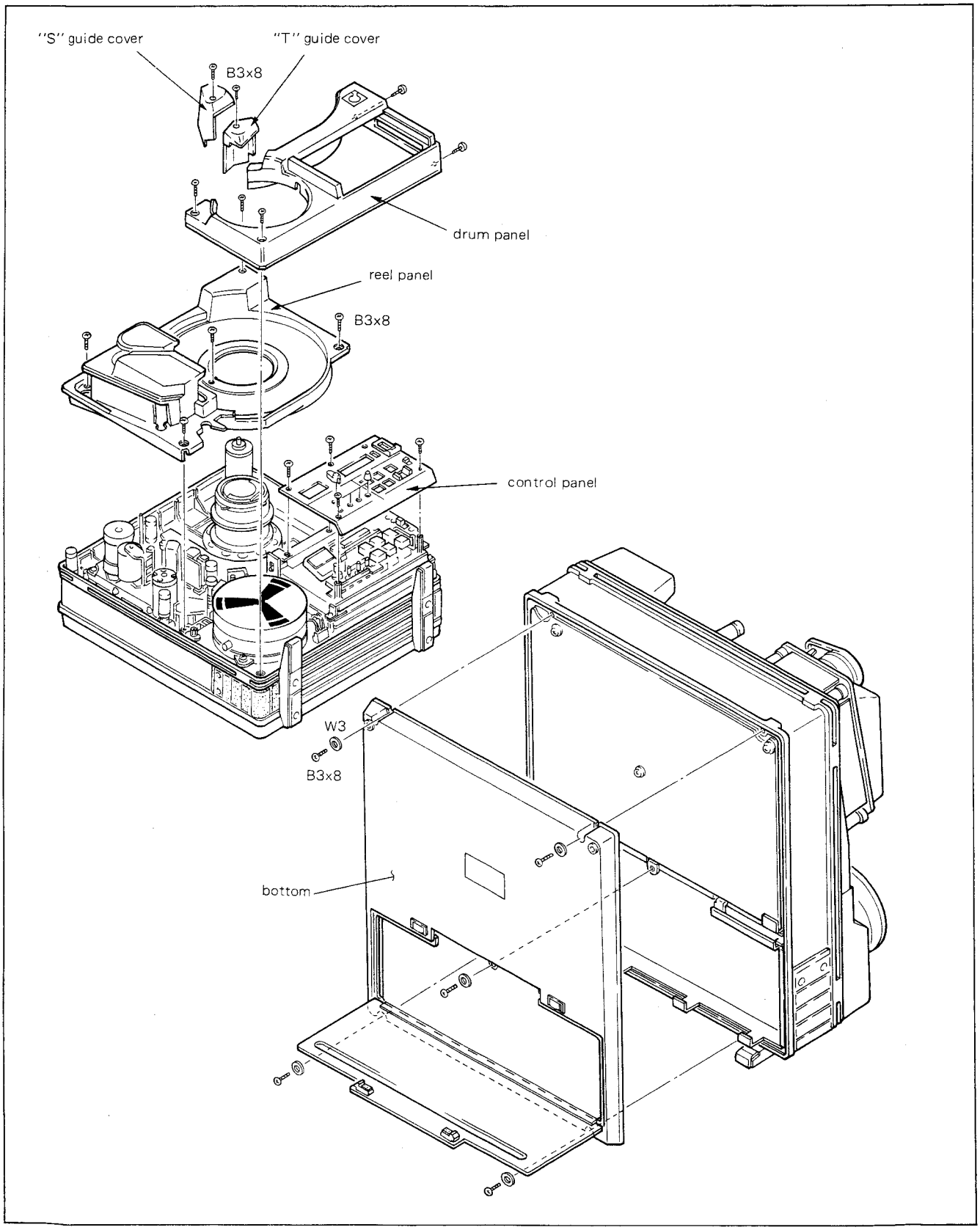
– NOTE –
Remove this tape after the adjustment.

– PROCEDURE –

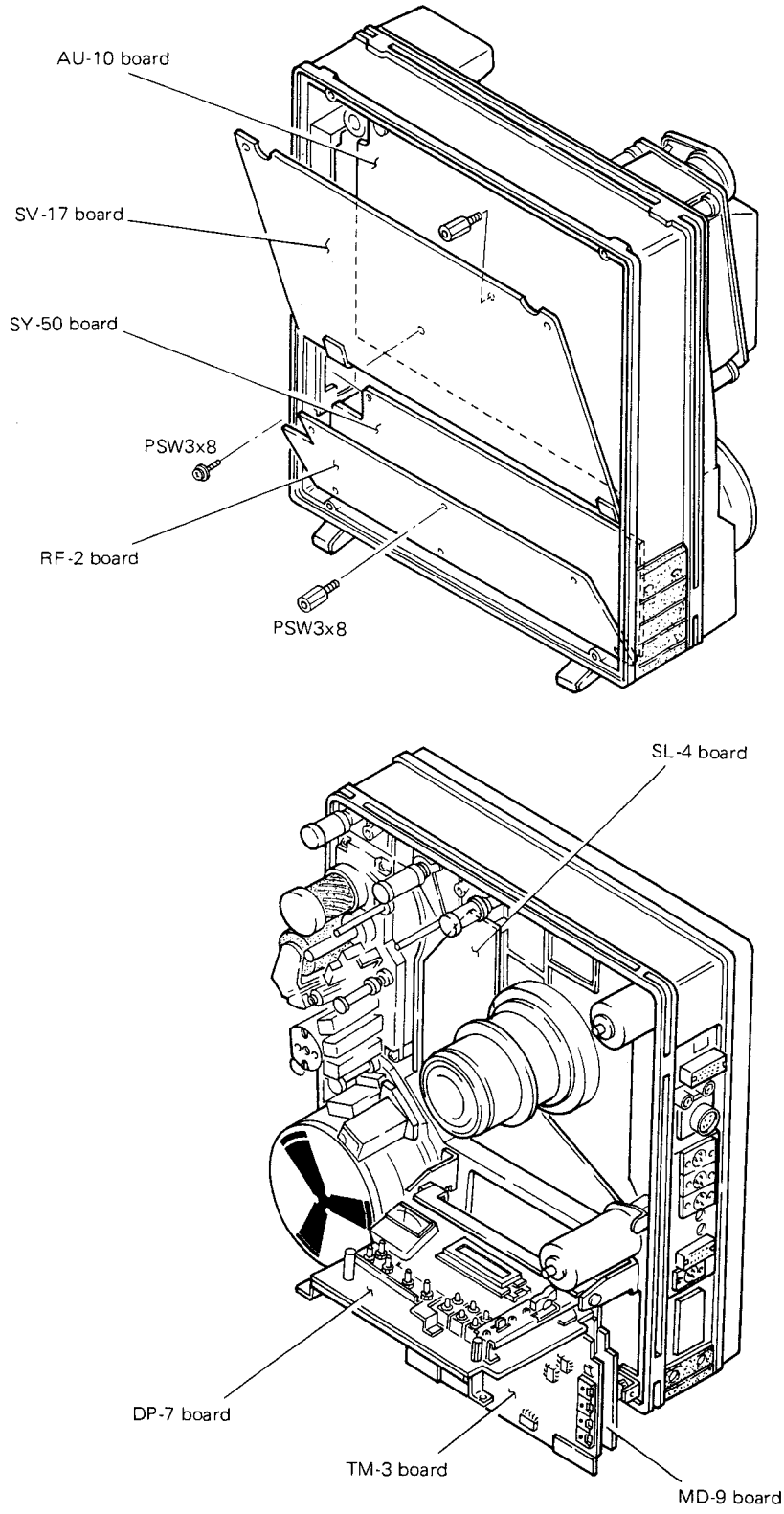
1. Remove the "S" guide panel and T guide panel, drum panel and reel panel referring to Section 2-2.
2. Put an opaque tape over the photo-coupler for tape detection so that it does not function.
3. Remove the take-up reel and the supply reel drive belt.
4. Put a rubber band on the reel shaft and the counter roller, as shown in the above figure.

– NOTE –
You can set the machine in the PLAY mode without threading a tape by performing above procedure. However, as the STOP button does not function, turn off the power to reset the machine in the STOP mode.

2-2. REMOVAL OF THE PANELS



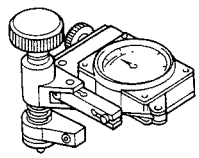
2-3. LAYOUT OF PRINTED CIRCUIT BOARDS



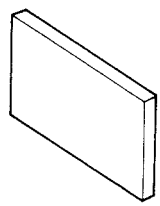
2-4. ADJUSTMENT JIGS

The parts number and the use of jig for mechanical adjustment.

J-1 : J-604-075-0B
- Drum eccentricity adj. jig
- Use to measure the head tip and to adjust drum eccentricity.

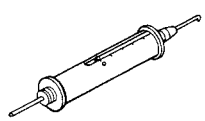


J-2 : J-604-016-0A
- flat plate
- Use to adjust slant of the pinch-roller and fixed head.

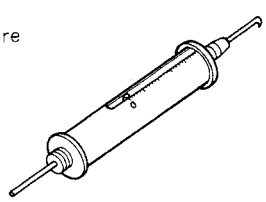


J-3 : J-604-046-0A
- Tapered screw
- Use to adjust the position of the upper drum.

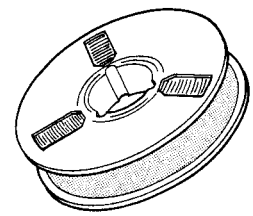
J-4 : J-604-163-0A
- Tension scale (200gr)
- Use to adjust the reel break torque.



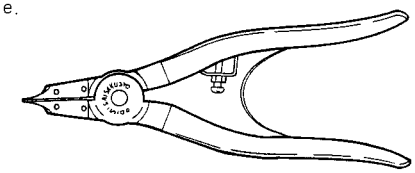
J-5 : J-604-163-0A
- Tension scale (5kg)
- Use to adjust the pressure of the pinch-roller.



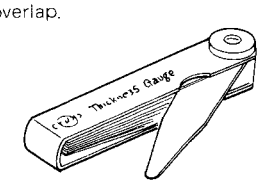
J-6 : for NTSC (BR5-2) 8-944-005-02
: for PS (BR5-2 PS) 8-944-005-52
: for PM (BR5-2 PM) 8-944-015-12
- Alignment tape



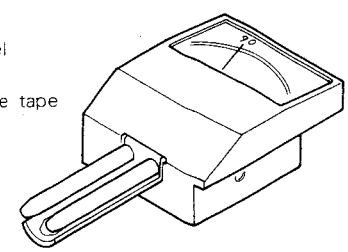
J-7 : J-604-166-0A
- Stop-ring plier
- Use to adjust the height of reel table.



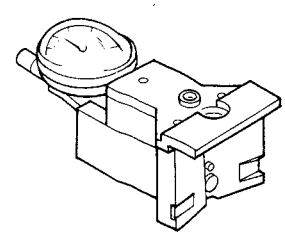
J-8 : J-604-167-0A
- Thickness gauge
- Use to adjust the overlap.



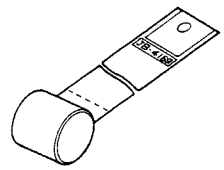
J-9 : Commertially available SONY Part No. J-604-168-0A
- Tentelometer Model T2-H12-2
- Use to measure the tape tension.



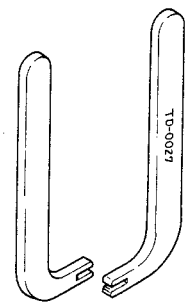
J-10 : J-604-071-0A
- Measure for headtip projection
- Use to measure the head tip (The eccentricity of the upper drum can not be measured with this measure. However, the head tip projection can be measured with this without removing the panels.)



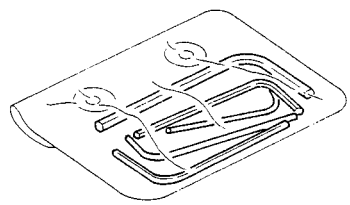
J-11 : J-604-169-0A
- Weight for calibration
- Use to calibrate the tape tension meter. (tentelometer)



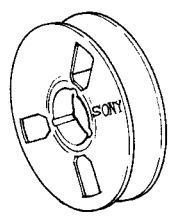
J-12 : J-604-165-0A
- Tension arm bending jig
- Use to adjust the bending of tension arm.



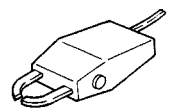
J-13 : J-604-170-0A
- Set of allen wrenches



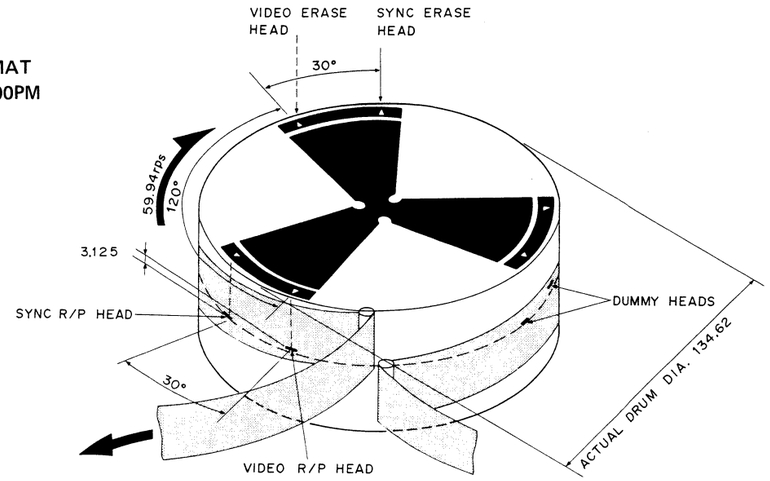
J-14 : Commertially available
- Empty reel
- Use to adjust brake torque.

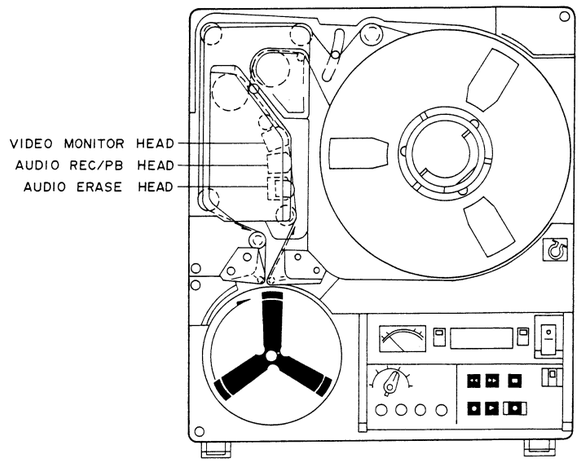


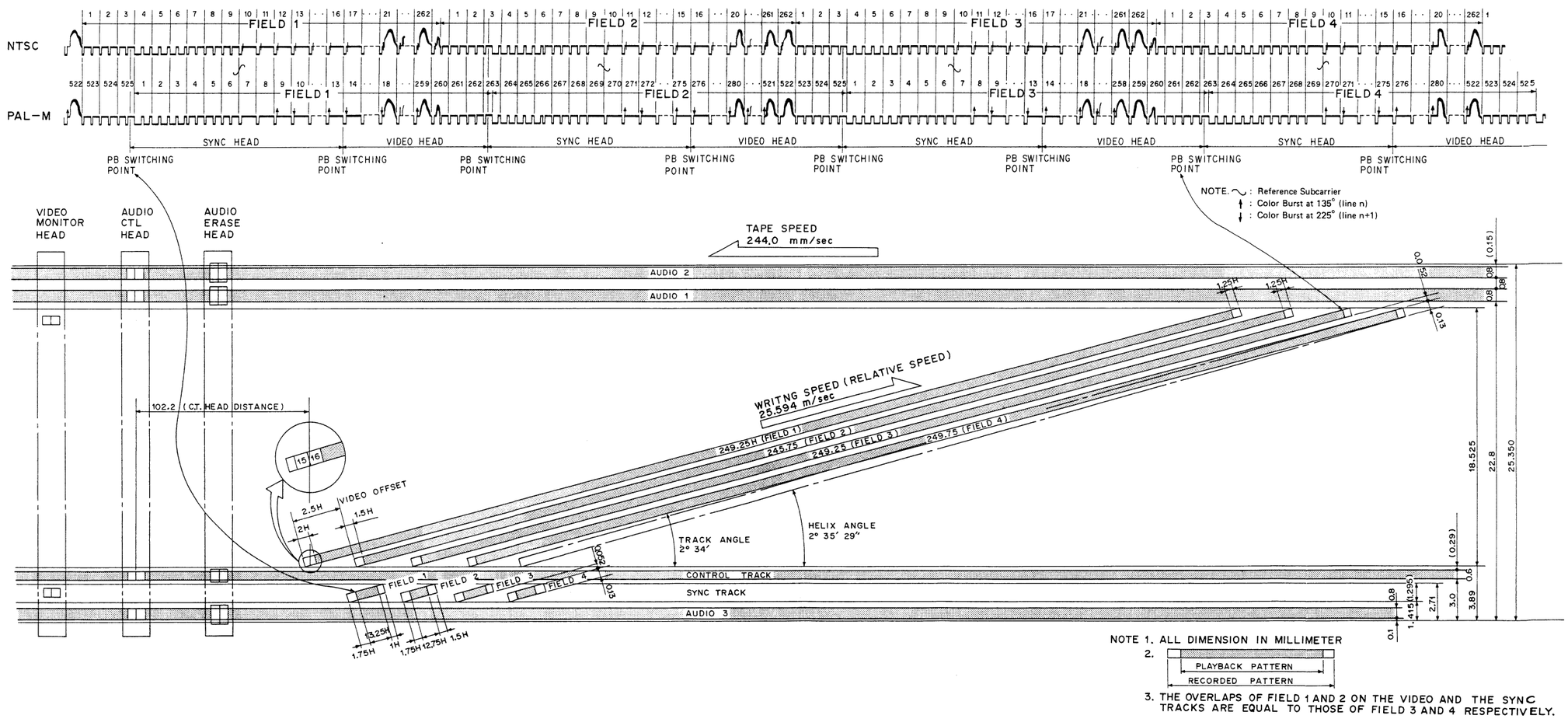
J-15 : Commertially available
SONY HE-2 or HE-3
Demagnetizer



2-5. TAPE FORMAT
BVH-500, 500PM



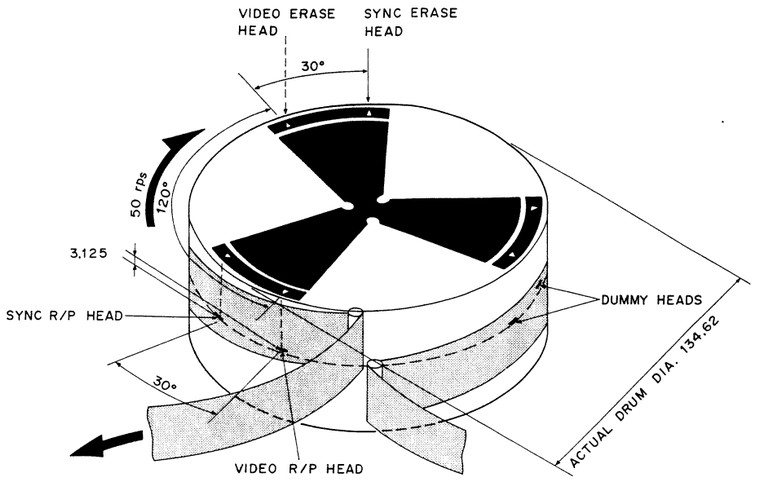


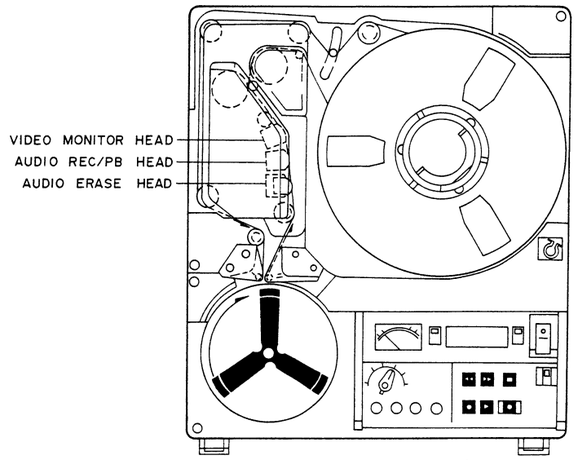


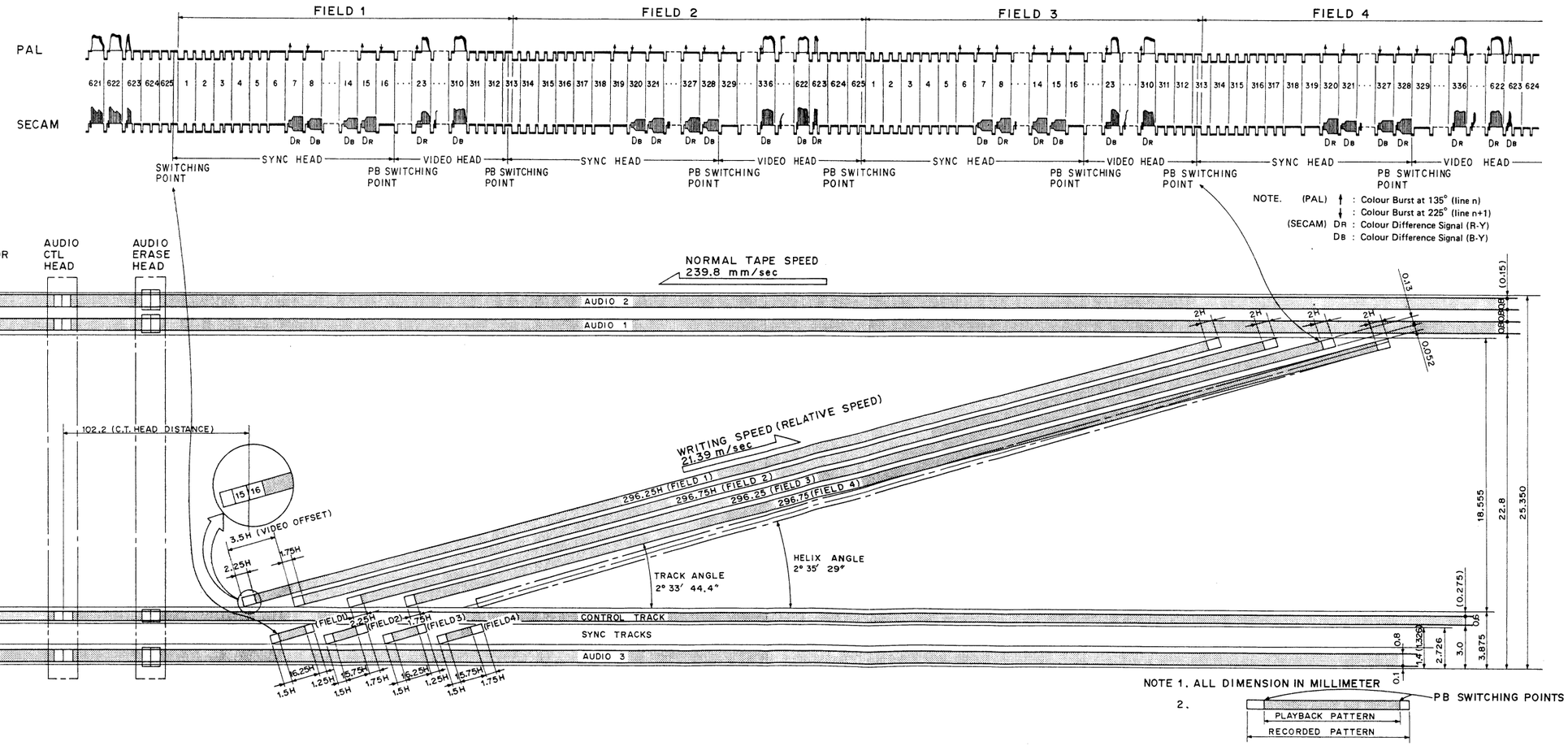
NOTE 1. ALL DIMENSION IN MILLIMETER

2. PLAYBACK PATTERN / RECORDED PATTERN

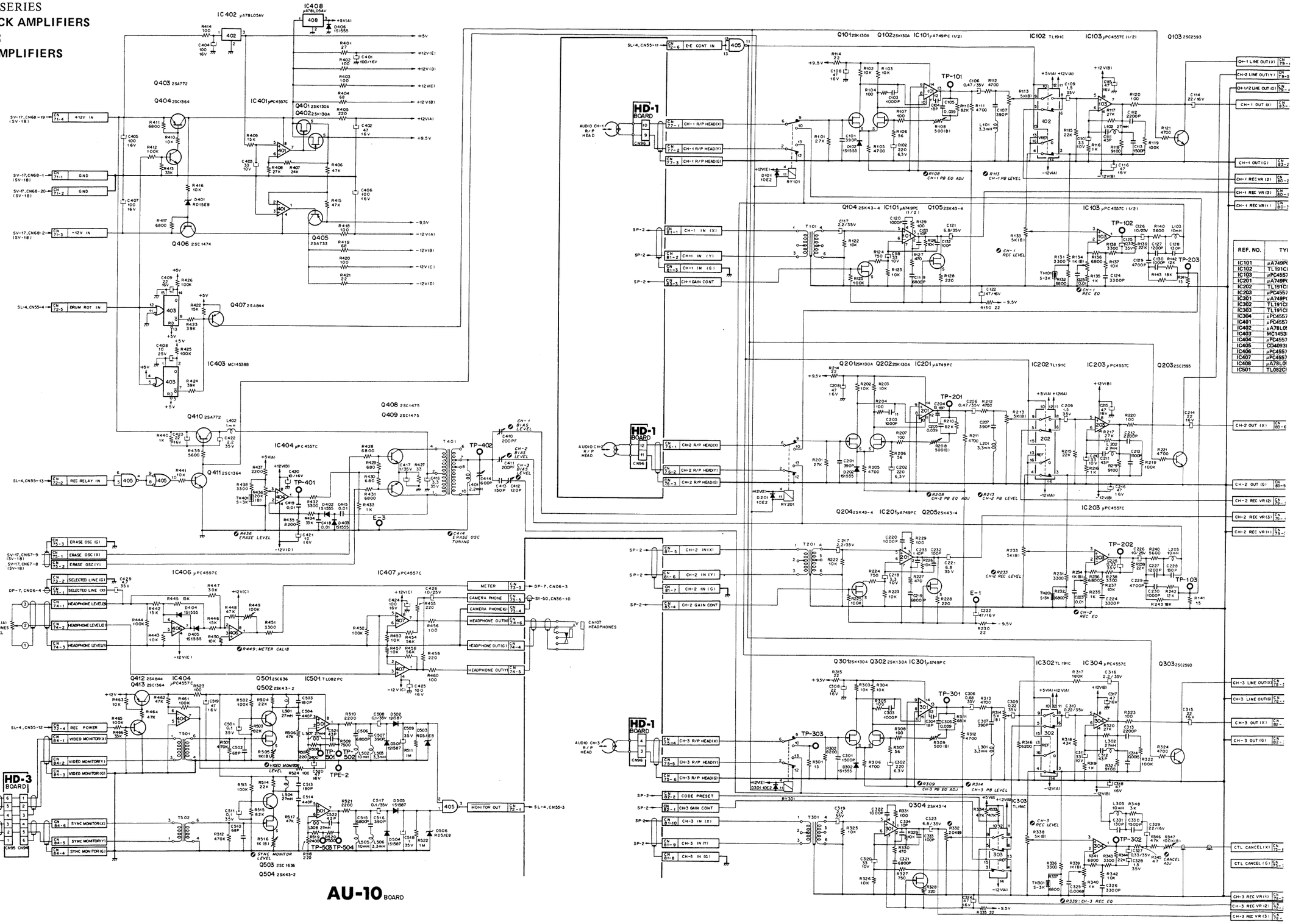
3. THE OVERLAPS OF FIELD 1 AND 2 ON THE VIDEO AND THE SYNC TRACKS ARE EQUAL TO THOSE OF FIELD 3 AND 4 RESPECTIVELY.


VIDEO ERASE HEAD
SYNC ERASE HEAD
30°
50 rps
120°
3.125
SYNC R/P HEAD
DUMMY HEADS
30°
ACTUAL DRUM DIA. 134.62
VIDEO R/P HEAD


VIDEO MONITOR HEAD
AUDIO REC/PB HEAD
AUDIO ERASE HEAD


FIELD 1
FIELD 2
FIELD 3
FIELD 4
PAL
SECAM
SYNC HEAD
VIDEO HEAD
SWITCHING POINT
PB SWITCHING POINT
NOTE. (PAL) ↑ : Colour Burst at 135° (line n)
↓ : Colour Burst at 225° (line n+1)
(SECAM) DR : Colour Difference Signal (R-Y)
DB : Colour Difference Signal (B-Y)
VIDEO MONITOR HEAD
AUDIO CTL HEAD
AUDIO ERASE HEAD
NORMAL TAPE SPEED
239.8 mm/sec
AUDIO 2
AUDIO 1
AUDIO 3
102.2 (C.T. HEAD DISTANCE)
WRITING SPEED (RELATIVE SPEED)
21.39 m/sec
296.25H (FIELD 1)
296.75H (FIELD 2)
296.25 (FIELD 3)
296.75(FIELD 4)
3.5H (VIDEO OFFSET)
2.25H
1.75H
TRACK ANGLE
2° 33' 44.4"
HELIX ANGLE
2° 35' 29"
CONTROL TRACK
SYNC TRACKS
(FIELD1)
(FIELD2)
(FIELD3)
(FIELD4)
16.25H
15.75H
1.5H
1.25H
1.75H
2H
0.13
0.05
(0.15)
0.8
(0.325)
1.4
2.726
3.0
3.875
(0.275)
0.6
18.555
22.8
25.350
0.1
NOTE 1. ALL DIMENSION IN MILLIMETER
2.
PB SWITCHING POINTS
PLAYBACK PATTERN
RECORDED PATTERN

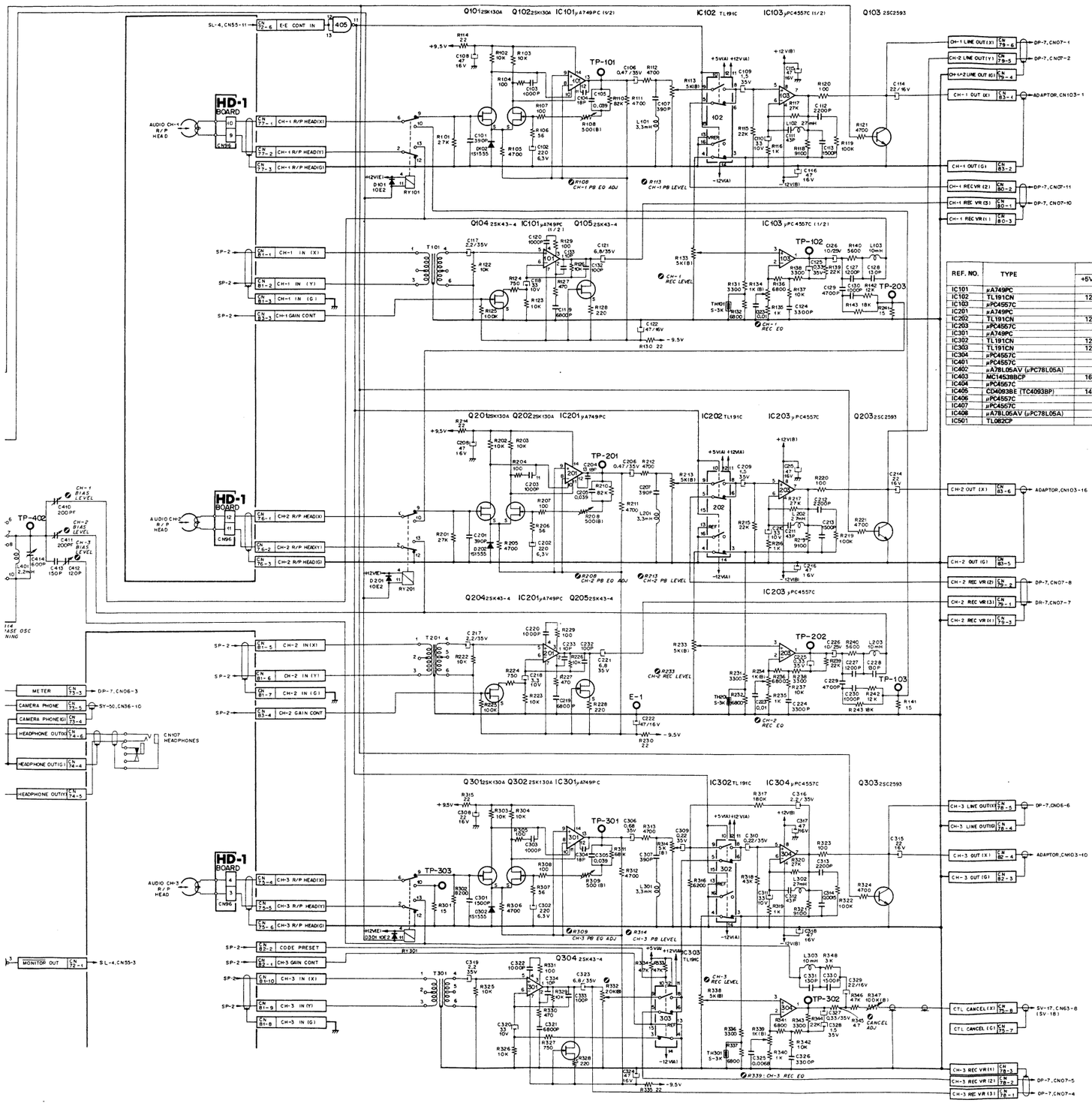
AU-10 BOARD REF. NO. 1,000SERIES
AUDIO RECORD/PLAYBACK AMPLIFIERS
AUDIO BIAS OSCILLATOR
VIDEO/SYNC MONITOR AMPLIFIERS



REF. NO.	TYI
IC101	μA749P(
IC102	TL191C(
IC103	μPC455
IC201	μA749P(
IC202	TL191C(
IC203	μPC455
IC301	μA749P(
IC302	TL191C(
IC303	TL191C(
IC304	μPC455
IC401	μPC455
IC402	μA78L0
IC403	MC14538
IC404	μPC455
IC405	CD4093
IC406	μPC455
IC407	μPC455
IC408	μA78L0
IC501	TL082C

AU-10 BOARD

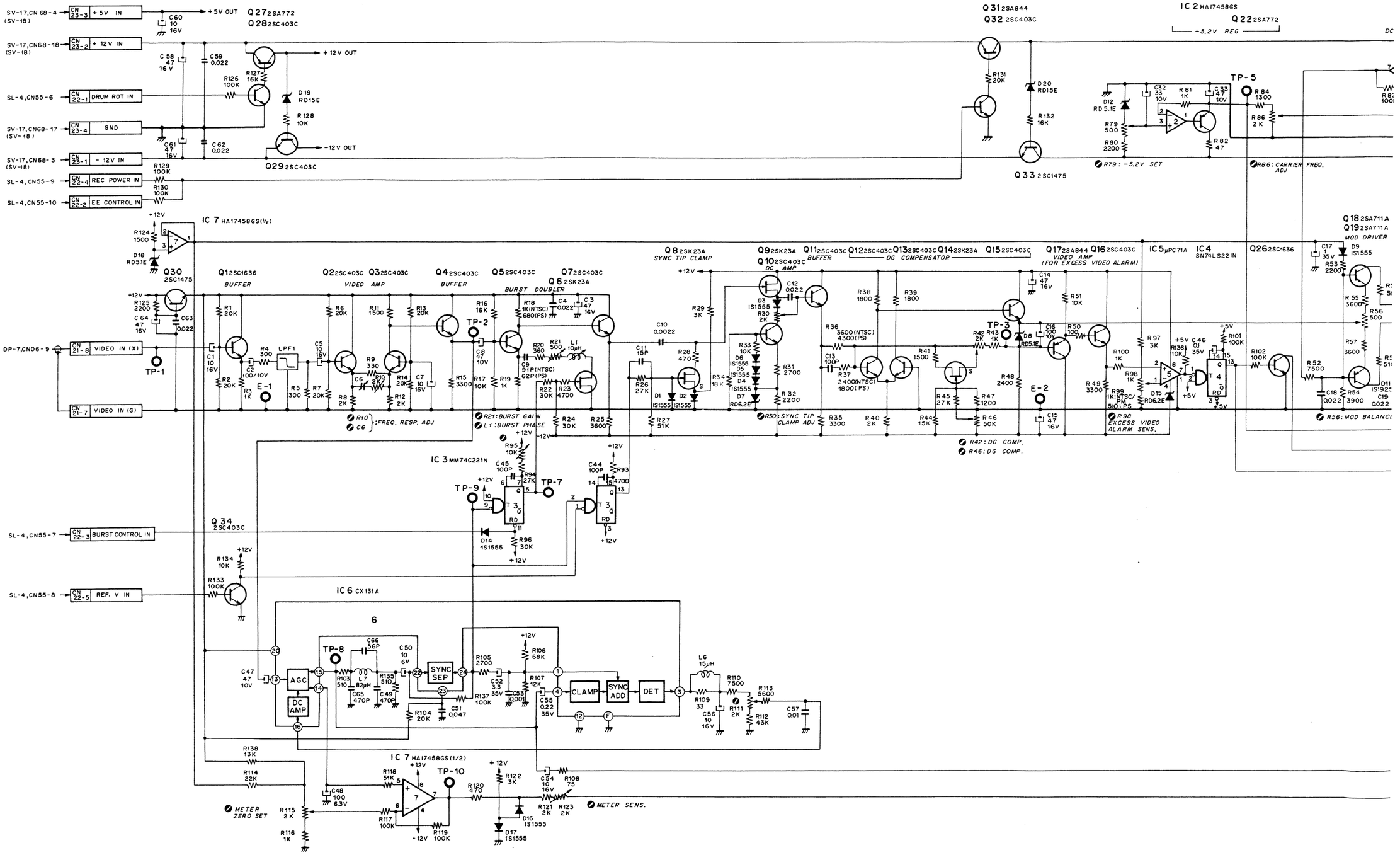
AU-10

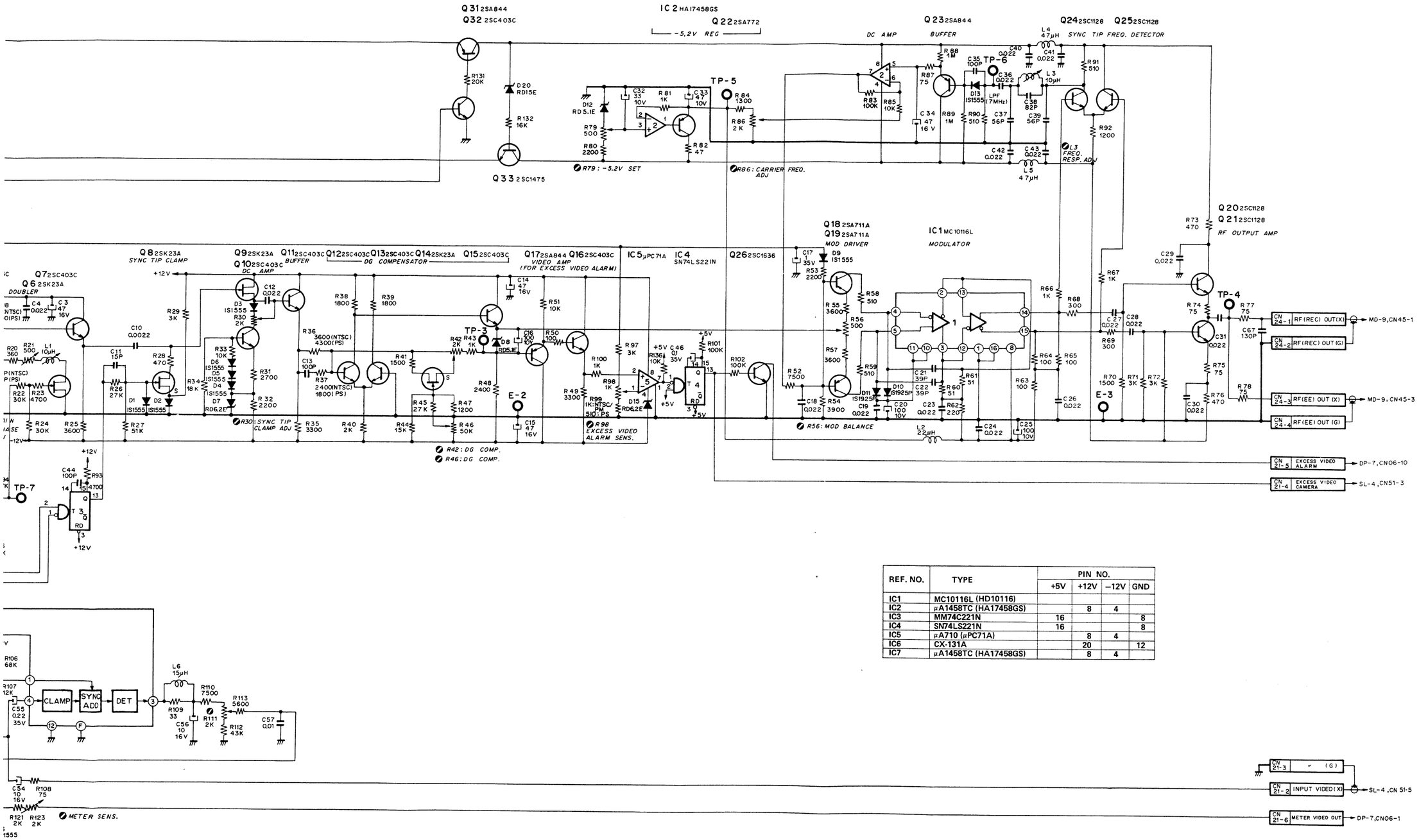


REF. NO.	TYPE	PIN NO.			
		+5V	+12V	−12V	GND
IC101	μA749PC		14	7	
IC102	TL191CN	12	11	14	
IC103	μPC4557C		8	4	
IC201	μA749PC		14	7	
IC202	TL191CN	12	11	14	
IC203	μPC4557C		8	4	
IC301	μA749PC		14	7	
IC302	TL191CN	12	11	14	
IC303	TL191CN	12	11	14	
IC304	μPC4557C		8	4	
IC401	μPC4557C		8	4	
IC402	μA78L05AV (μPC78L05A)		1		3
IC403	MC14538BCP	16			8
IC404	μPC4557C		8	4	
IC405	CD4093BE (TC4093BP)	14			7
IC406	μPC4557C		8	4	
IC407	μPC4557C		8	4	
IC408	μA78L05AV (μPC78L05A)		1		3
IC501	TL082CP		8		

MD-9 BOARD REF. NO. 2,000SERIES

MODULATOR



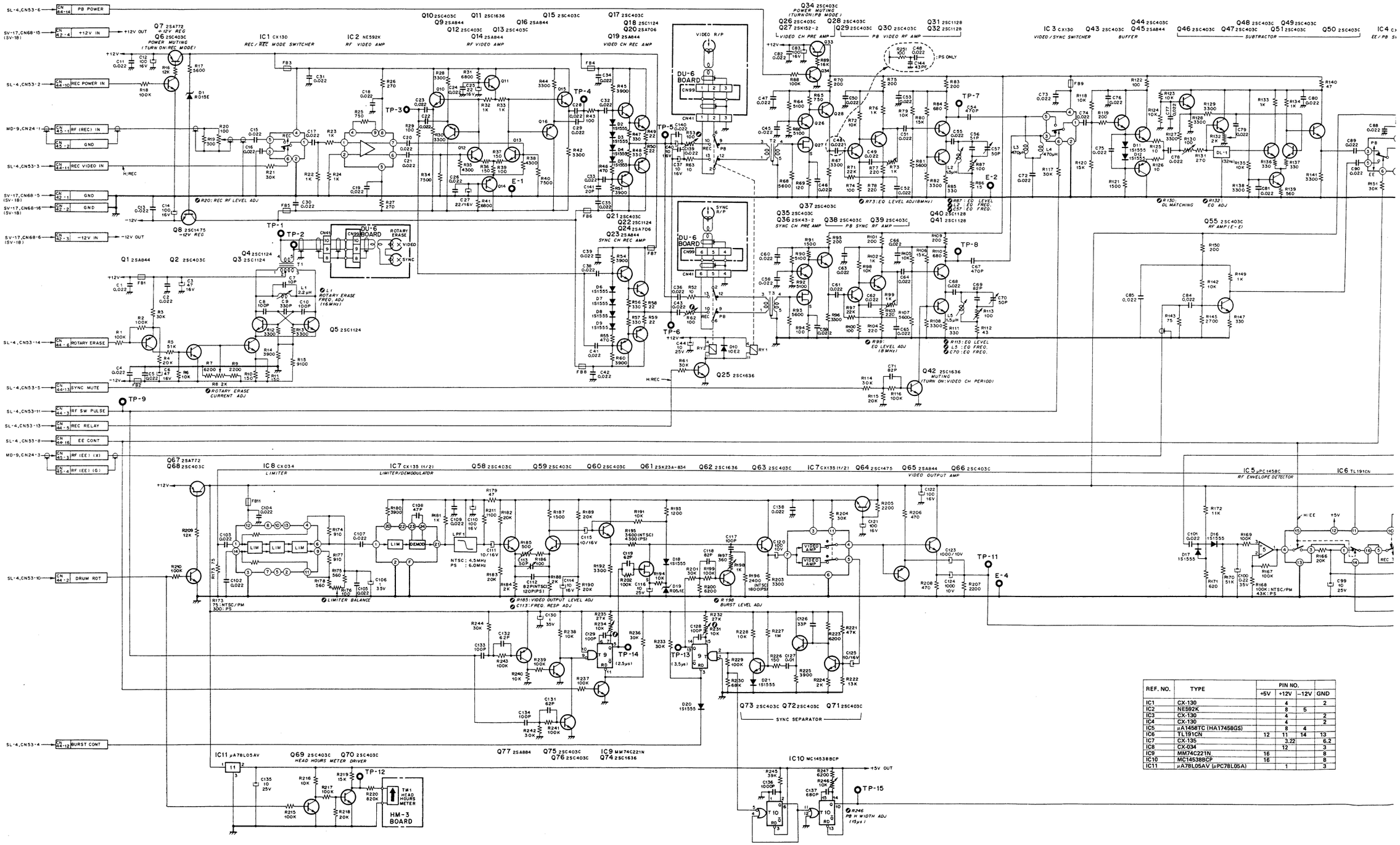


REF. NO.	TYPE	PIN NO.			
		+5V	+12V	−12V	GND
IC1	MC10116L (HD10116)				
IC2	μA1458TC (HA17458GS)		8	4	
IC3	MM74C221N	16			8
IC4	SN74LS221N	16			8
IC5	μA710 (μPC71A)		8	4	
IC6	CX-131A		20		12
IC7	μA1458TC (HA17458GS)		8	4	

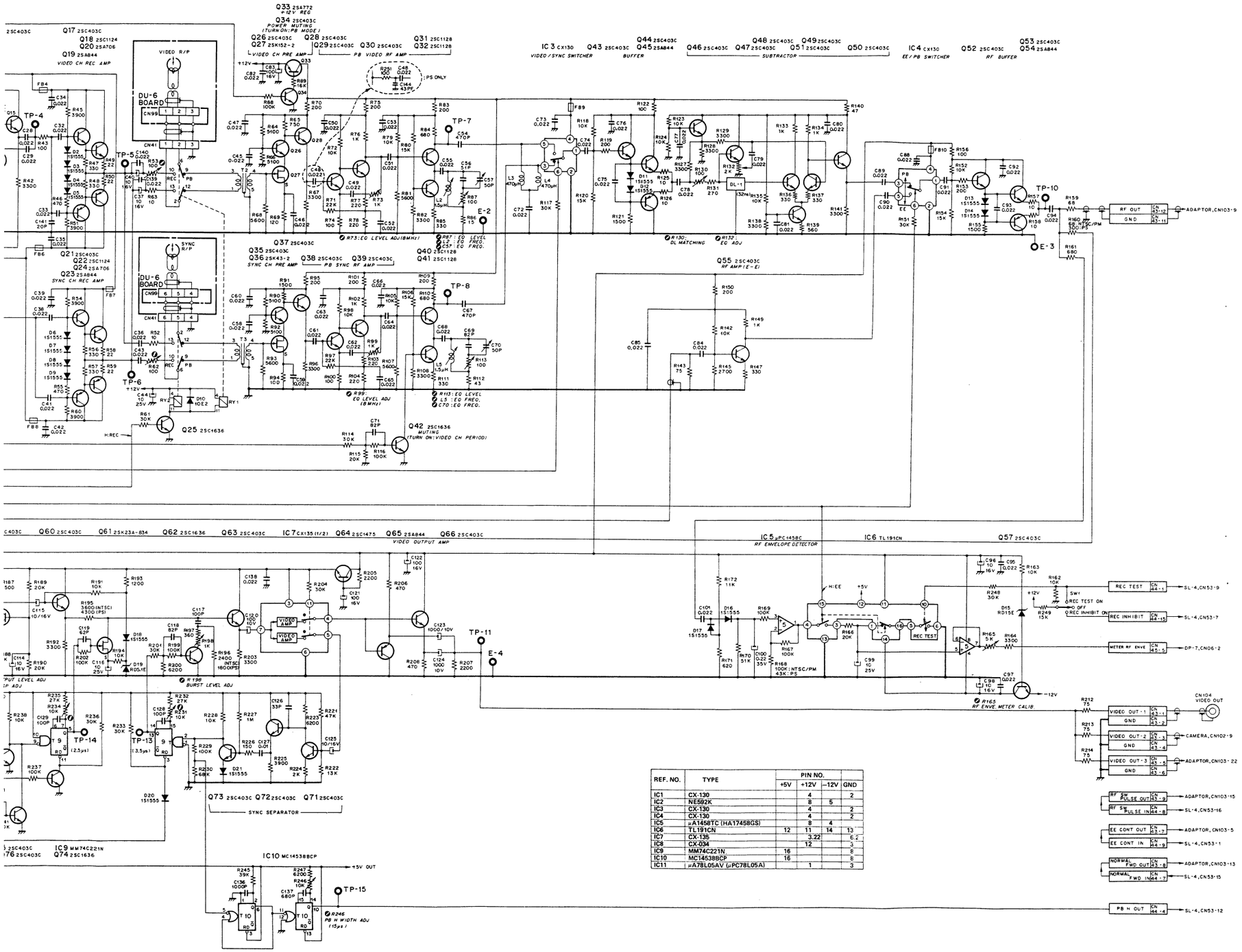
RF-2 BOARD REF. NO. 3,000SERIES

RECORD/PLAYBACK RF AMPLIFIERS

DEMODULATOR



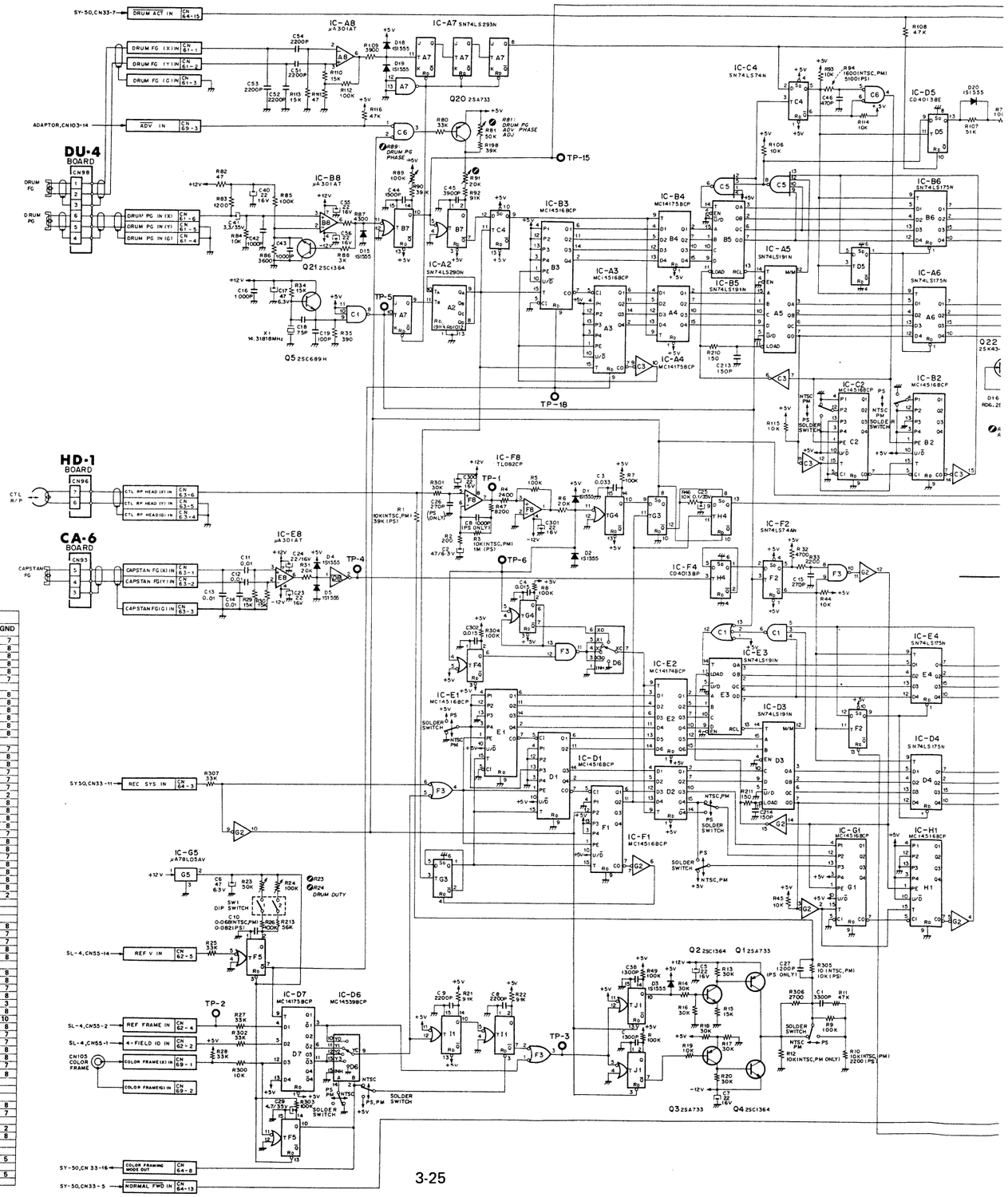
REF. NO.	TYPE	PIN NO.			
		+5V	+12V	−12V	GND
IC1	CX-130		4		2
IC2	NE592K		8	5	
IC3	CX-130		4		2
IC4	CX-130		4		2
IC5	μA1458TC (HA17458GS)		8	4	
IC6	TL191CN	12	11	14	13
IC7	CX-135		3,22		6,2
IC8	CX-034		12		3
IC9	MM74C221N	16			8
IC10	MC14538BCP	16			8
IC11	μA78L05AV (μPC78L05A)		1		3



REF. NO.	TYPE	PIN NO.			
		+5V	+12V	−12V	GND
IC1	CX-130		4		2
IC2	NE592K		8	5	
IC3	CX-130		4		2
IC4	CX-130		4		2
IC5	μA1458TC (HA17458GS)		8	4	
IC6	TL191CN	12	11	14	13
IC7	CX-135		3.22		6.2
IC8	CX-034		12		3
IC9	MM74C221N	16			8
IC10	MC14538BCP	16			8
IC11	μA78L05AV (μPC78L05A)		1		3

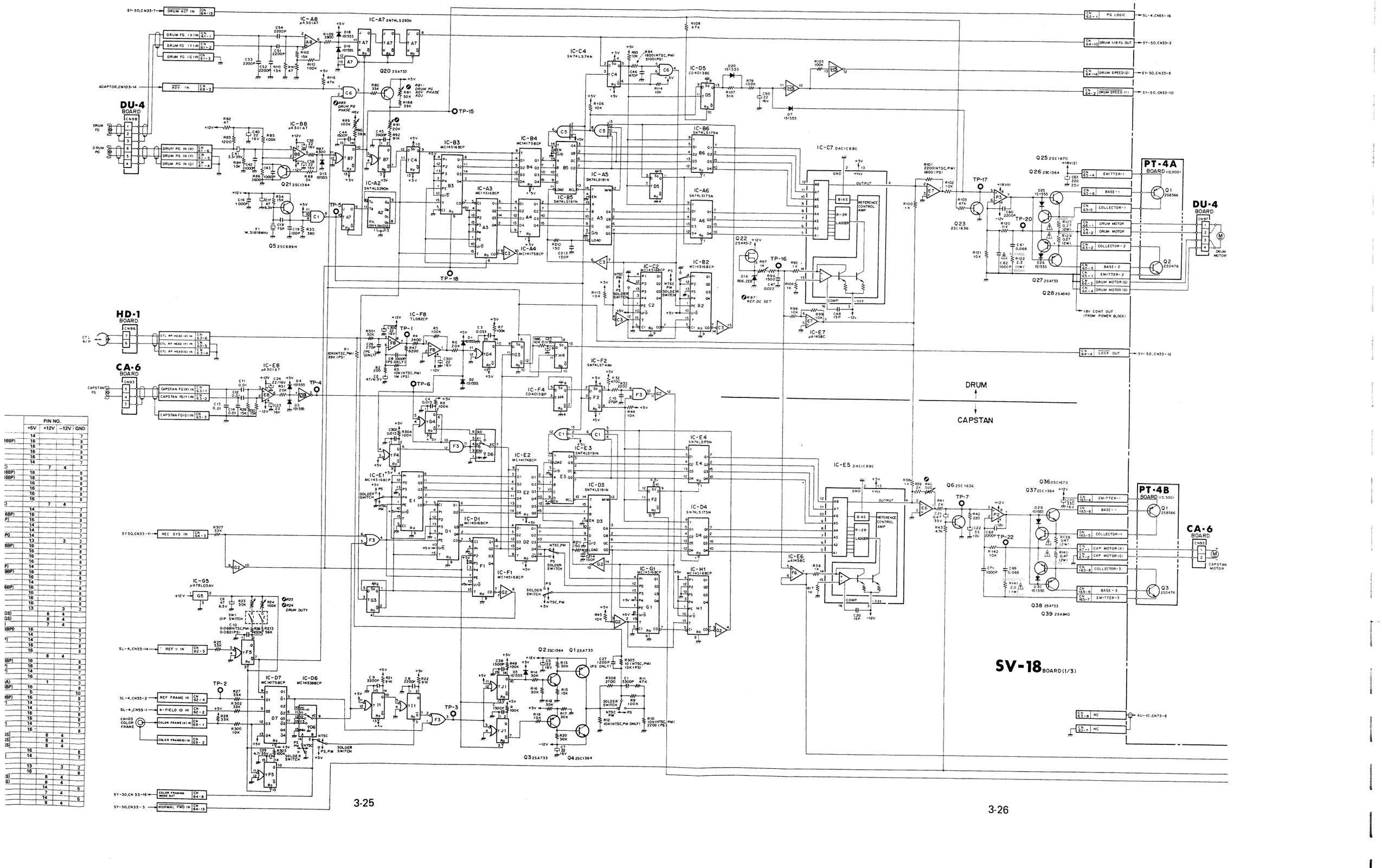
SV-18(1/3)

SV-18 BOARD REF. NO. 4,000SERIES
DRUM/CAPSTAN MOTOR DIGITAL SERVO



REF. NO.	TYPE	PIN NO.			
		+5V	+12V	−12V	GND
IC-A2	SN74LS290N	14			7
IC-A3	MC14516BCP (TC4516BP)	16			8
IC-A4	MC14175BCP	16			8
IC-A5	SN74LS191N	16			8
IC-A6	SN74LS175N	16			8
IC-A7	SN74LS293N	14			7
IC-A8	μA301AT (μPC301AC)		7	4	
IC-B2	MC14516BCP (TC4516BP)	16			8
IC-B3	MC14516BCP (TC4516BP)	16			8
IC-B4	MC14175BCP	16			8
IC-B5	SN74LS191N	16			8
IC-B6	SN74LS175N	16			8
IC-B7	MC14538BCP	16			8
IC-B8	μA301AT (μPC301AC)		7	4	
IC-C1	SN74LS10N	14			7
IC-C2	MC14516BCP (TC4516BP)	16			8
IC-C3	CD4049BE (TC4049BP)	16			8
IC-C4	SN74LS74N	14			7
IC-C5	SN74LS20N	14			7
IC-C6	CD4001BE (TC4001BP0	14			7
IC-C7	DAC1C88C	13		3	2
IC-D1	MC14516BCP (TC4516BP)	16			8
IC-D2	MC14175BCP	16			8
IC-D3	SN74LS191N	16			8
IC-D4	SN74LS175N	16			8
IC-D5	CD4013BE (TC4013BP)	14			7
IC-D6	MC14539BCP (TC4539BP)	16			8
IC-D7	MC14175BCP	16			8
IC-D8	MC14584BCP	14			7
IC-E1	MC14516BCP (TC4516BP)	16			8
IC-E2	MC14174BCP	16			8
IC-E3	SN74LS191N	16			8
IC-E4	SN74LS175N	16			8
IC-E5	DAC1C88C	13		3	2
IC-E6	μA1458TC (HA17458GS)		8	4	
IC-E7	μA1458TC (HA17458GS)		8	4	
IC-E8	μA301AT (μPC301AC)		7	4	
IF-F1	MC14516BCP (TC4516BP0	16			8
IC-F2	SN74LS74N	14			7
IC-F3	CD4011BE (TC4011BP)	14			7
IC-F4	MC14538BCP	16			8
IC-F5	MC14538BCP	16			8
IC-F8	TL082CP		8	4	
IC-G1	MC14516BCP (TC4516BP)	16			8
IC-G2	CD4049BE (TC4049BP)	16			8
IC-G3	CD4013BE (TC4013BP)	14			7
IC-G4	MC14538BCP	16			8
IC-G5	μA78L05A (μPC78L05A)		1		3
IC-H1	MC14516BCP (TC4516BP)	16			8
IC-H2	MM74C90N	5			10
IC-H3	MC14520BCP (TC4520BP)	16			8
IC-H4	CD4013BE (TC4013BP)	14			7
IC-H5	MC14584BCP	14			7
IC-I1	MC14538BCP	16			8
IC-I2	MC14728CP	16			8
IC-I3	CD4068BE (TC4068BP)	14			7
IC-I4	MC14538BCP	16			8
IC-I5	μA1458TC (HA17458GS)		8	4	
IC-I6	μA1458TC (HA17458GS)		8	4	
IC-I7	μA1458TC (HA17458GS)		8	4	
IC-J1	MC14538BCP	16			8
IC-J2	CD4013BP (TC4013BP)	14			7
IC-J3	MC14174BCP				
IC-J4	DAC1C88C	13		3	2
IC-P1	MC145728CP	16			8
IC-P2	μA1458TC (HA17458GS)		8	4	
IC-P3	μA1458TC (HA17458GS)		8	4	
IC-P4	TL497CN	14			5
IC-P5	LF357N		7	4	
IC-P6	TL497CN	14			5
IC-401	TL082CP		8	4	

SV-18 BOARD REF. NO. 4,000SERIES
DRUM/CAPSTAN MOTOR DIGITAL SERVO


DU-4 BOARD
HD-1 BOARD
CA-6 BOARD
PT-4A BOARD (13,0001)
PT-4B BOARD (13,3001)
DRUM
CAPSTAN
SV-18 BOARD(1/3)
IC-A8 µA301AT
IC-A7 SN74LS293N
IC-A2 SN74LS290N
IC-A3 MC14516BCP
IC-A4 MC14175BCP
IC-A5 SN74LS191N
IC-A6 SN74LS175N
IC-B8 µA301AT
IC-B3 MC14516BCP
IC-B4 MC14175BCP
IC-B5 SN74LS191N
IC-B6 SN74LS175N
IC-B2 MC14516BCP
IC-C2 MC14516BCP
IC-C4 SN74LS74N
IC-C7 DAC1C08C
IC-D5 CD4013BE
IC-D1 MC14516BCP
IC-D2 MC14174BCP
IC-D3 SN74LS191N
IC-D4 SN74LS175N
IC-D7 MC14175BCP
IC-D6 MC14539BCP
IC-E8 µA301AT
IC-E1 MC14516BCP
IC-E2 MC14174BCP
IC-E3 SN74LS191N
IC-E4 SN74LS175N
IC-E5 DAC1C08C
IC-E6 µA1458C
IC-E7 µA1458C
IC-F8 TL082CP
IC-F2 SN74LS74N
IC-F4 CD4013BP
IC-F1 MC14516BCP
IC-G5 µA78L05AV
IC-G1 MC14516BCP
IC-H1 MC14516BCP
Q20 2SA733
Q21 2SC1364
Q5 2SC689H
Q22 2SK43-2
Q23 2SC1636
Q25 2SC1670
Q26 2SC1364
Q27 2SA733
Q28 2SA840
Q6 2SC1636
Q36 2SC1670
Q37 2SC1364
Q38 2SA733
Q39 2SA840
Q1 2SA733
Q2 2SC1364
Q3 2SA733
Q4 2SC1364
Q1 2SB566
Q2 2S0476
Q3 2S0476
TP-1
TP-2
TP-3
TP-4
TP-5
TP-6
TP-7
TP-15
TP-16
TP-17
TP-18
TP-20
TP-22
SW1 DIP SWITCH
SOLDER SWITCH
REFERENCE CONTROL AMP
R-2R LADDER
DRUM DUTY
DRUM MOTOR
CAPSTAN MOTOR
SY-50,CN33-7
ADAPTOR,CM103-14
SY-50,CN33-11
SY-50,CN33-16
SY-50,CN33-5
SL-4,CN55-14
SL-4,CN55-2
SL-4,CN55-1
CN103 COLOR FRAME
AU-10,CN75-8
DRUM ACT IN
DRUM FG (X) IN
DRUM FG (Y) IN
DRUM FG (G) IN
ADV IN
DRUM PG IN (X)
DRUM PG IN (Y)
DRUM PG IN (G)
CTL R/P
CTL RP HEAD (X) IN
CTL RP HEAD (Y) IN
CTL RP HEAD (G) IN
CAPSTAN FG (X) IN
CAPSTAN FG (Y) IN
CAPSTAN FG (G) IN
REC SYS IN
REF V IN
REF FRAME IN
4-FIELD ID IN
COLOR FRAME (X) IN
COLOR FRAME (G) IN
COLOR FRAMING MODE OUT
NORMAL FWD IN
PG LOGIC
DRUM 1/8 FG OUT
DRUM SPEED (2)
DRUM SPEED (1)
LOCK OUT
EMITTER-1
BASE-1
COLLECTOR-1
DRUM MOTOR
DRUM MOTOR
COLLECTOR-2
BASE-2
EMITTER-2
DRUM MOTOR (G)
DRUM MOTOR (G)
18V CONT OUT (FROM POWER BLOCK)
CAP MOTOR (X)
CAP MOTOR (G)
COLLECTOR-3
BASE-3
EMITTER-3
NC
NC
R307 33K
R302 33K
R28 33K
R300 10K
R303 100K
R304 100K
R305 10K (NTSC,PM) 10K (PS)
R306 2700
R211 150
R214 150P
R212 10K
R45 10K
R97 1K
R95 1K
R96 1500
R104 1K
R98 10K
R99 10K
R100 1K
R101 2200(NTSC,PM) 1800 (PS)
R102 10K
R103 47K
R121 10K
R122 2.2 2 (1W)
R123 0.27 (2W)
R124 0.27 (2W)
R139 0.47 (2W)
R140 0.47 (2W)
R141 2.2 2 (1W)
R142 10K
R43 47K
R44 10K
R36 1K
R39 2K
R40 500
R41 2K
R42 220
R22 220
R23 50K
R24 100K
R26 200K
R213 56K
R35 390
R1 10K(NTSC,PM) 39K (PS)
R2 200
R3 10K(NTSC,PM) 1M (PS)
R4 2400
R47 8200
R5 100K
R6 70K
R7 100K
R8 100K
R9 100K
R10 10K(NTSC,PM) 2200 (PS)
R11 47K
R12 10K(NTSC,PM ONLY)
R13 30K
R14 30K
R15 15K
R16 30K
R17 30K
R18 30K
R19 10K
R20 30K
R21 9.9K
R22 9.9K
R27 33K
R31 10K
R32 470Ω 33 2200
R33 4.7K
R34 15K
R46 1500
R48 100K
R49 100K
R50 100K
R51 100K
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R79 10K
R80 33K
R81 50K
R82 47
R83 1200
R84 10K
R85 100K
R86 1000P 3600
R87 1800
R88 3K
R89 100K
R90 39K
R91 20K
R92 91K
R93 10K
R94 (1800(NTSC,PM) 5100(PS)
R98 47K
R105 100K
R106 10K
R107 51K
R108 47K
R109 3900
R110 15K
R111 15K
R112 100K
R113 47
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R120 11P
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R192 10K
R193 10K
R194 10K
R195 10K
R196 10K
R197 10K
R198 10K
R199 10K
R200 10K
C1 3300P
C2 0.068
C3 0.033
C4 470P
C5 0.022
C6 0.068
C7 22
C8 2200P
C9 2200P
C10 0.068(NTSC,PM) 0.0821(PS)
C11 0.01
C12 0.01
C13 0.01
C14 0.01
C15 270P
C16 1000P
C17 47
C18 15P
C19 100P
C20 15P
C21 0.47
C22 3.3
C23 22
C24 22/16V
C25 270P (PS ONLY)
C26 270P (PS ONLY)
C27 1200P (PS ONLY)
C28 1000P (PS ONLY)
C29 4.7/35V
C30 22
C31 22
C32 2200P
C33 2200P
C34 2200P
C35 2200P
C36 2200P
C37 2200P
C38 1300P
C39 0.015
C40 22
C41 0.022
C42 1000P
C43 1500P
C44 1500P
C45 3900P
C46 470P
C47 3.3/35V
C48 15P
C49 15P
C50 22
C51 22
C52 2200P
C53 2200P
C54 2200P
C55 22
C56 22
C57 22
C58 22
C59 22
C60 2200P
C61 0.068
C62 1000P
C63 220
C64 22
C65 22
C66 22
C67 22
C68 2200P
C69 0.068
C70 330
C71 1000P
C72 22
C73 22
C74 22
C75 22
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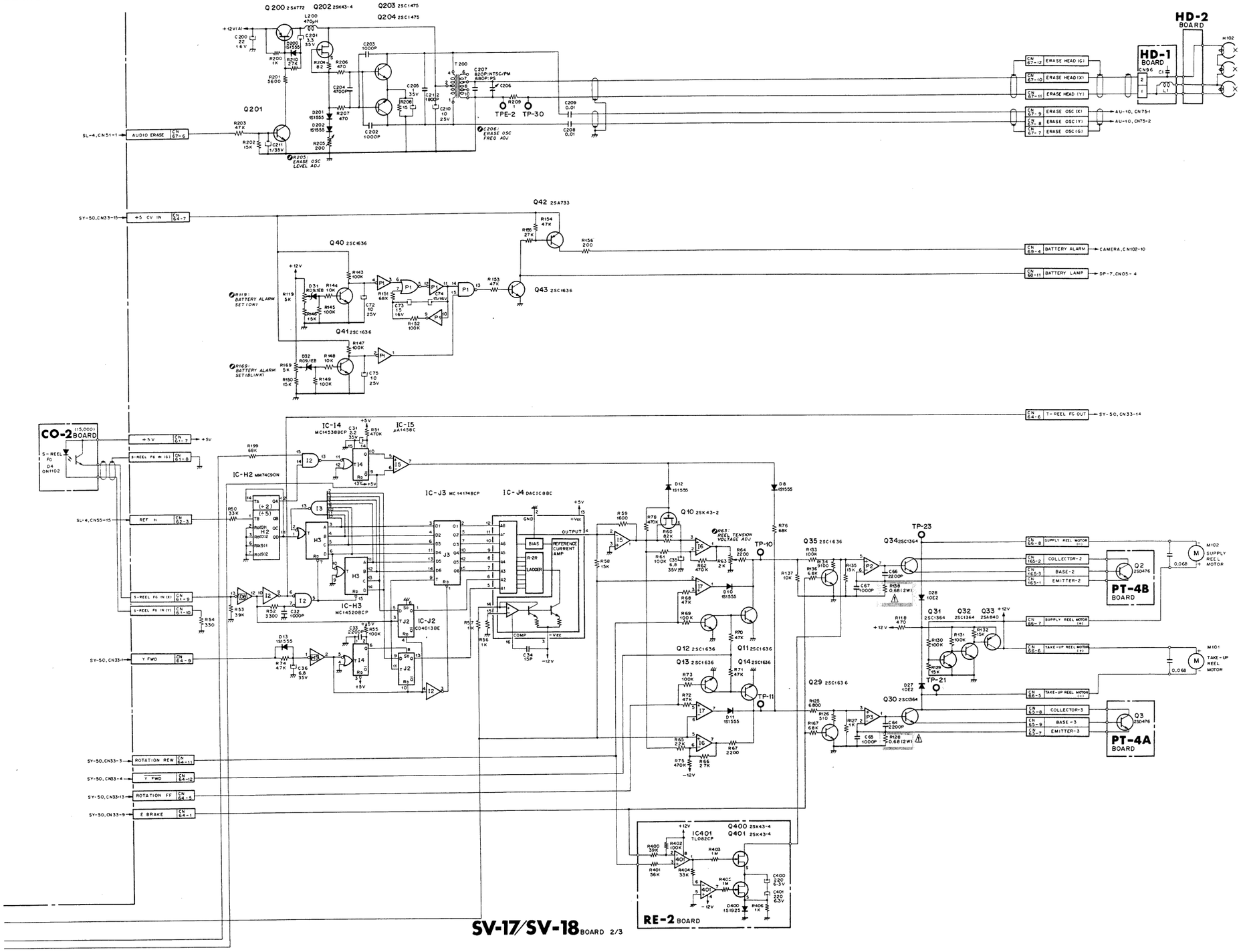
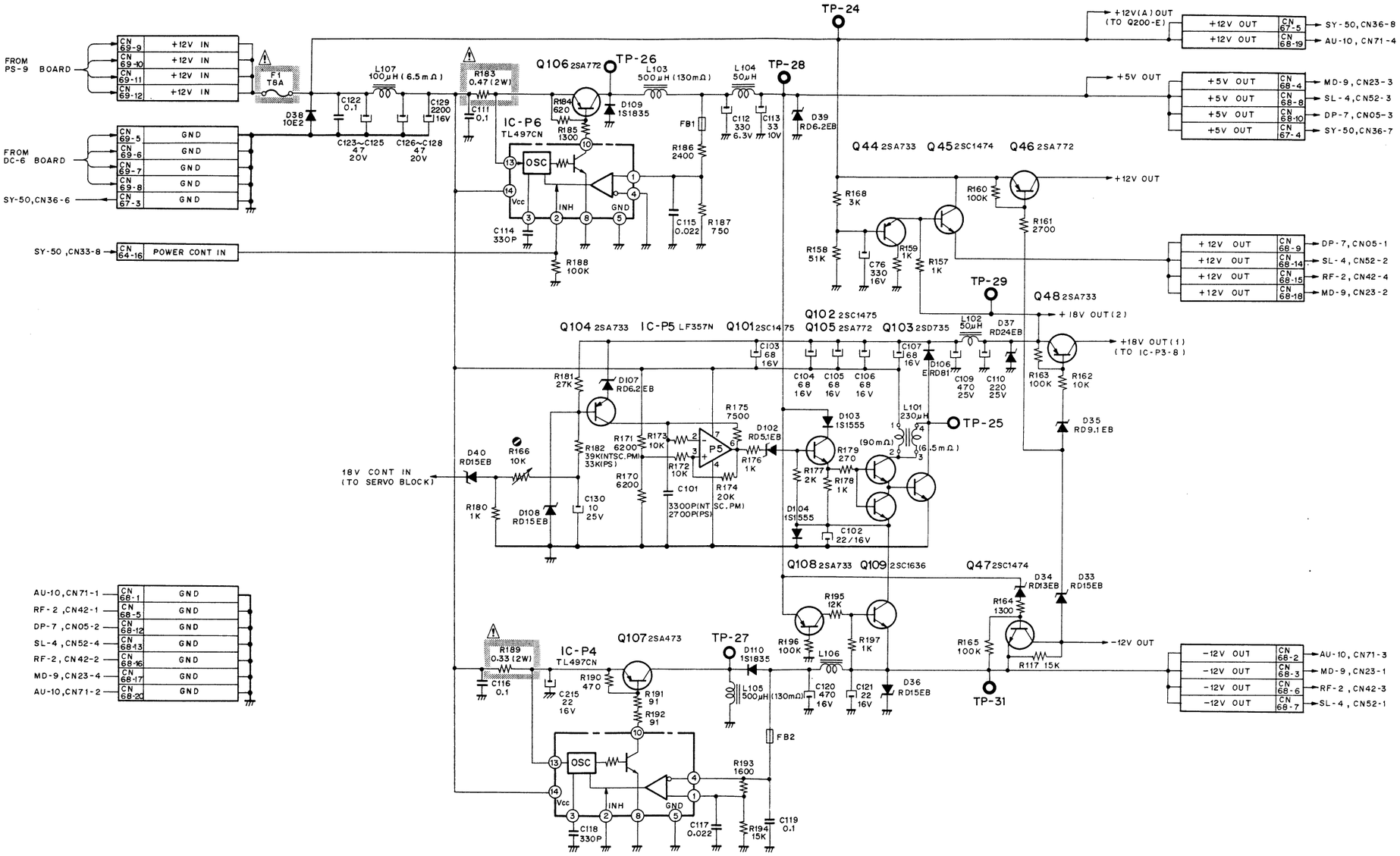
SY-18 BOARD REF. NO. 4,000SERIES

REEL MOTOR DIGITAL SERVO



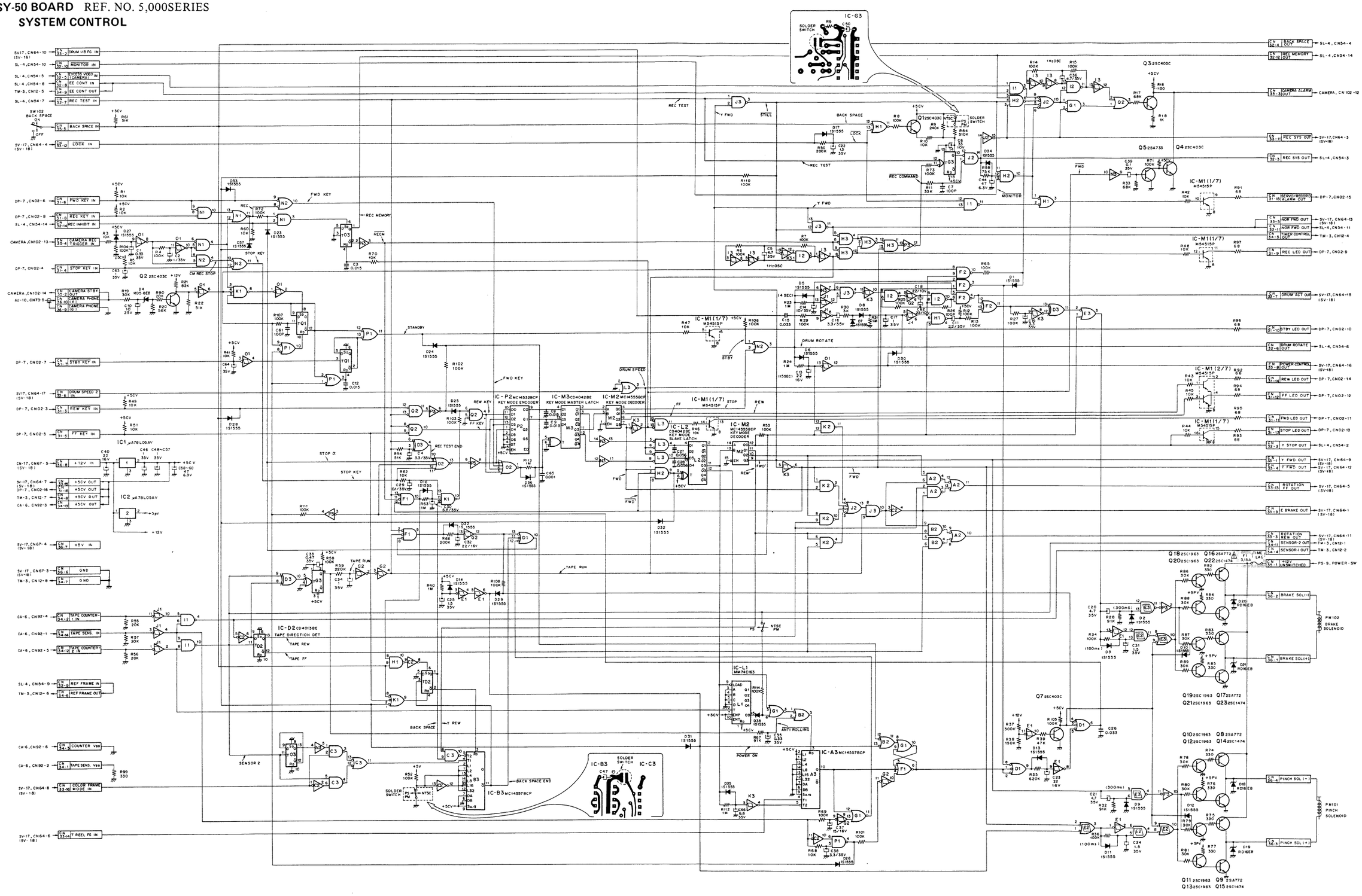
SV-17/SV-18 BOARD 2/3

SY-18 BOARD REF. NO. 4,000SERIES
SWITCHING REGULATOR

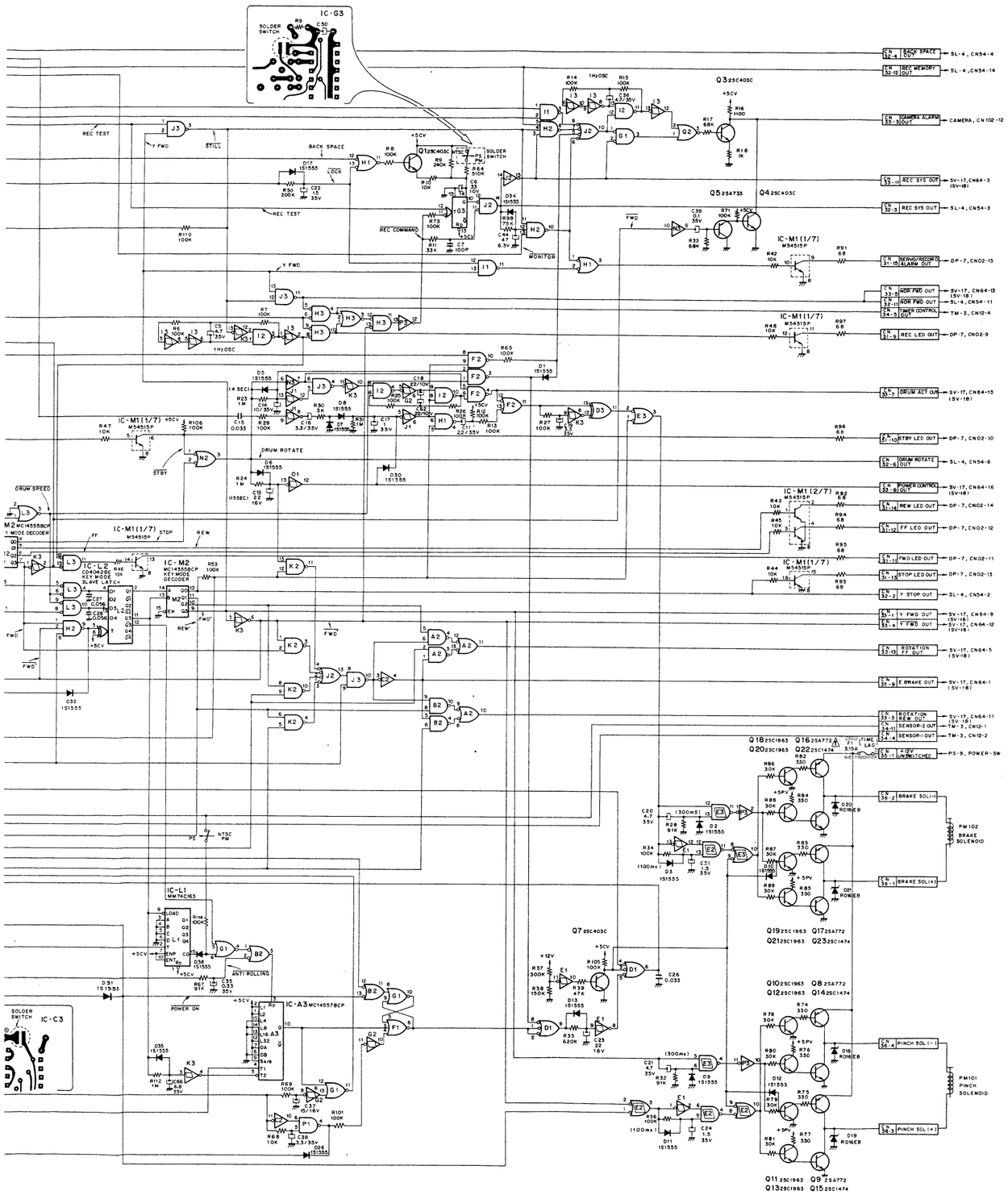


SY-50 BOARD REF. NO. 5,000SERIES

SYSTEM CONTROL



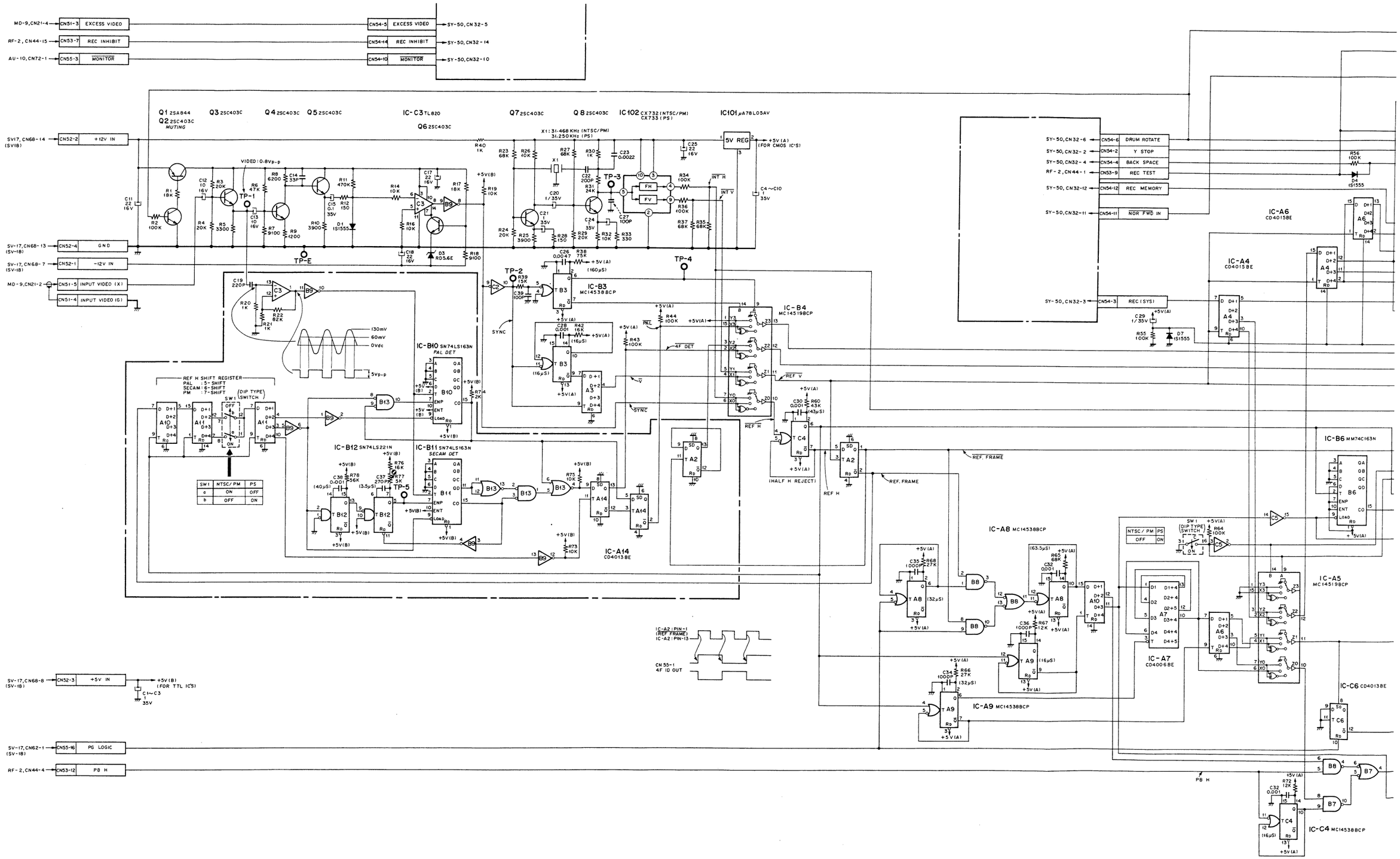
REF. NO.	TYPE
IC-A2	CD4011BE (T
IC-A3	MC14557BCP
IC-B2	CD4011BE (T
IC-B3	MC14557BCP
IC-C2	CD4069BE (T
IC-C3	CD4011BE (T
IC-D1	CD4023BE (T
IC-D2	CD4013BE (T
IC-D3	CD4030BE (T
IC-E1	MC14584BCP
IC-E2	CD4093BE (T
IC-E3	CD4093BE (T
IC-F1	CD4025BE (T
IC-F2	CD4011BE (T
IC-G1	CD4001BE (T
IC-G2	MC14584BCP
IC-G3	MC14538BCP
IC-H1	CD4011BE (T
IC-H2	CD4023BE (T
IC-H3	CD4001BE (T
IC-I1	CD4011BE (T
IC-I2	CD4093BE (T
IC-I3	MC14584BCP
IC-J1	MC14584BCP
IC-J2	MC14501BCP
IC-J3	CD4011BE (T
IC-K1	CD4023BE (T
IC-K2	CD4011BE (T
IC-K3	CD4069BE (T
IC-L1	MM74C163N
IC-L2	CD4042BE (T
IC-L3	CD4001BE (T
IC-M1	M54515P
IC-M2	MC14555BCP
IC-M3	CD4042BE (T
IC-N1	CD4001BE (T
IC-N2	CD4011BE (T
IC-N3	MC14538BCP
IC-O1	MC14584BCP
IC-O2	CD4002BE (T
IC-O3	CD4013BE (T
IC-P1	CD4011BE (T
IC-P2	MC14532BCP
IC-P3	CD4089BE (T
IC-Q1	CD4013BE (T
IC-Q2	CD4001BE (T
IC1	μA78L05AV
IC2	μA78L05AV

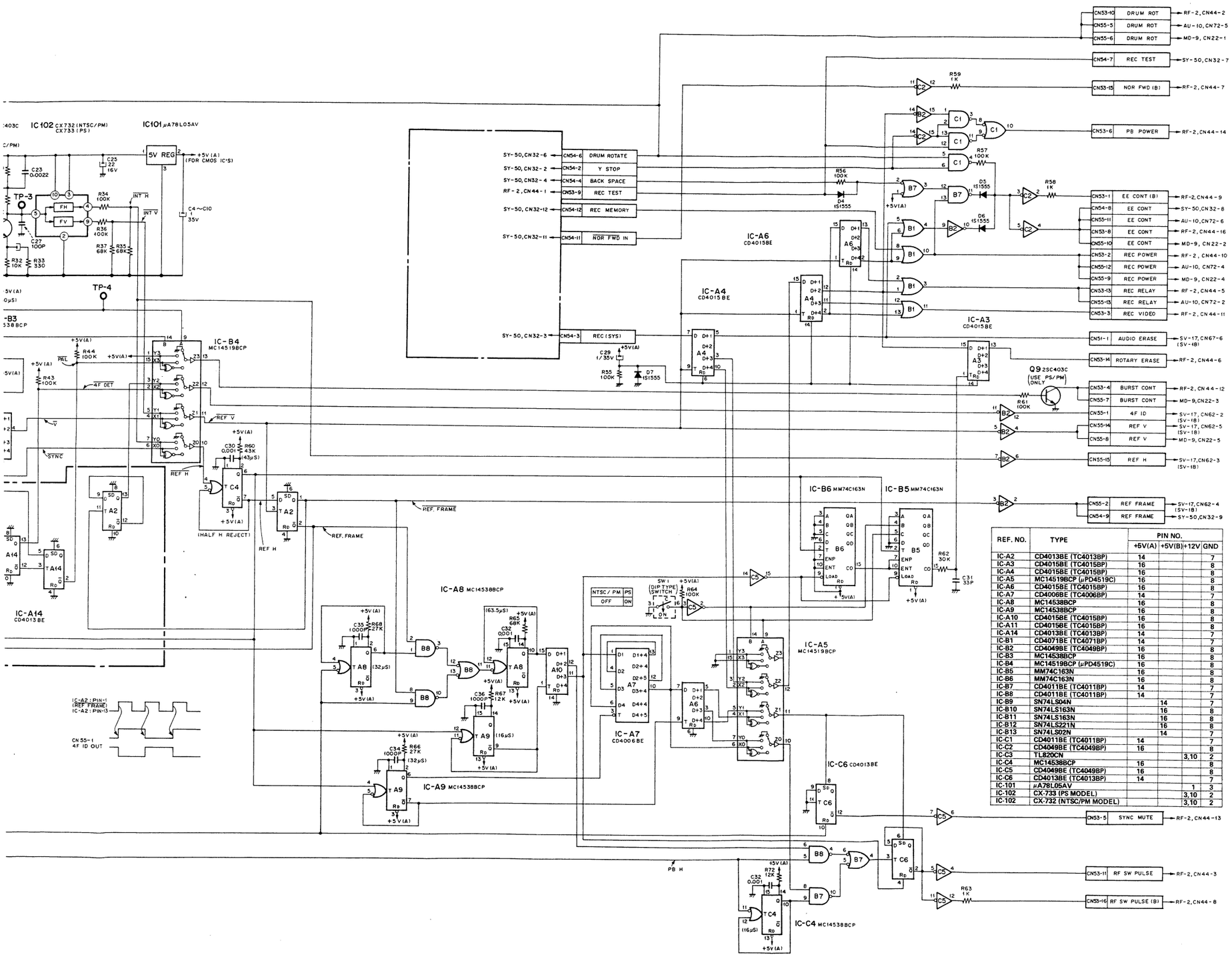


REF. NO.	TYPE	PIN NO.		
		+5V	+12V	GND
IC-A2	CD4011BE (TC4011BP)	14		7
IC-A3	MC14557BCP	16		8
IC-B2	CD4011BE (TC4011BP)	14		7
IC-B3	MC14557BCP	16		8
IC-C2	CD4069BE (TC4069BP)	14		7
IC-C3	CD4011BE (TC4011BP)	14		7
IC-D1	CD4023BE (TC4023BP)	14		7
IC-D2	CD4013BE (TC4013BP)	14		7
IC-D3	CD4030BE (TC4030BP)	14		7
IC-E1	MC14584BCP	14		7
IC-E2	CD4093BE (TC4093BP)	14		7
IC-E3	CD4093BE (TC4093BP)	14		7
IC-F1	CD4025BE (TC4025BP)	14		7
IC-F2	CD4011BE (TC4011BP)	14		7
IC-G1	CD4001BE (TC4001BP)	14		7
IC-G2	MC14584BCP	14		7
IC-G3	MC14538BCP	16		8
IC-H1	CD4011BE (TC4011BP)	14		7
IC-H2	CD4023BE (TC4023BP)	14		7
IC-H3	CD4001BE (TC4001BP)	14		7
IC-I1	CD4011BE (TC4011BP)	14		7
IC-I2	CD4093BE (TC4093BP)	14		7
IC-I3	MC14584BCP	14		7
IC-J1	MC14584BCP	14		7
IC-J2	MC14501BCP	16		8
IC-J3	CD4011BE (TC4011BP)	14		7
IC-K1	CD4023BE (TC4023BP)	14		7
IC-K2	CD4011BE (TC4011BP)	14		7
IC-K3	CD4069BE (TC4069BP)	14		7
IC-L1	MM74C163N	16		8
IC-L2	CD4042BE (TC4042BP)	16		8
IC-L3	CD4001BE (TC4001BP)	14		7
IC-M1	M54515P			8
IC-M2	MC14550BCP (TC4550BP)	16		8
IC-M3	CD4042BE (TC4042BP)	16		8
IC-N1	CD4001BE (TC4001BP)	14		7
IC-N2	CD4011BE (TC4011BP)	14		7
IC-N3	MC14503BCP (TC5012BP)	16		8
IC-O1	MC14584BCP	14		7
IC-O2	CD4002BE (TC4002BP)	14		7
IC-O3	CD4013BE (TC4013BP)	14		7
IC-P1	CD4011BE (TC4011BP)	14		7
IC-P2	MC14532BCP (TC4532BP)	16		8
IC-P3	CD4069BE (TC4069BP)	14		7
IC-Q1	CD4013BE (TC4013BP)	14		7
IC-Q2	CD4001BE (TC4001BP)	14		7
IC1	μA78L05AV (μPC78L05)		1	3
IC2	μA78L05AV (μPC78L05)		1	3

SL-4 BOARD REF. NO. 8,000SERIES

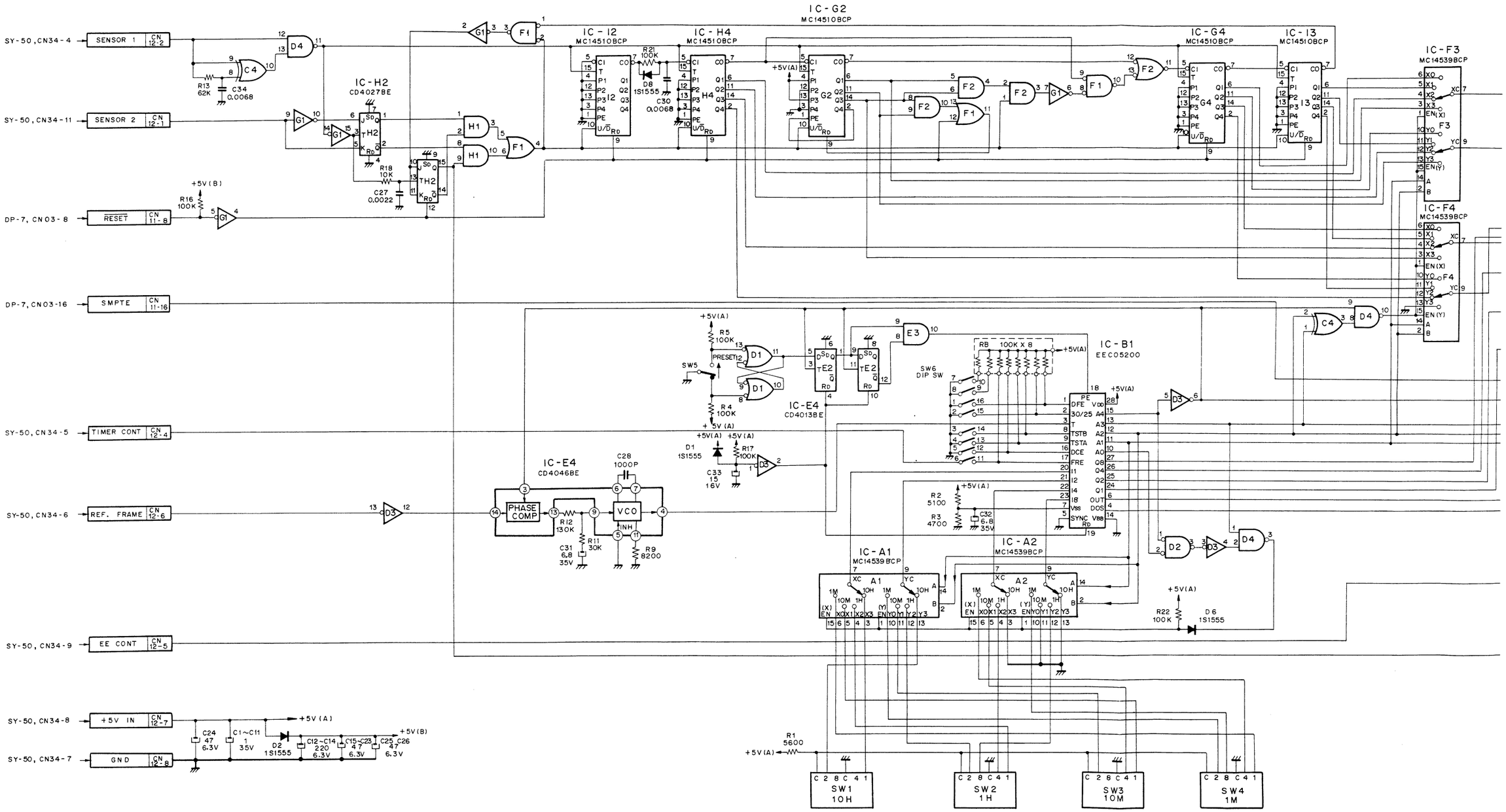
SWITCHING LOGIC



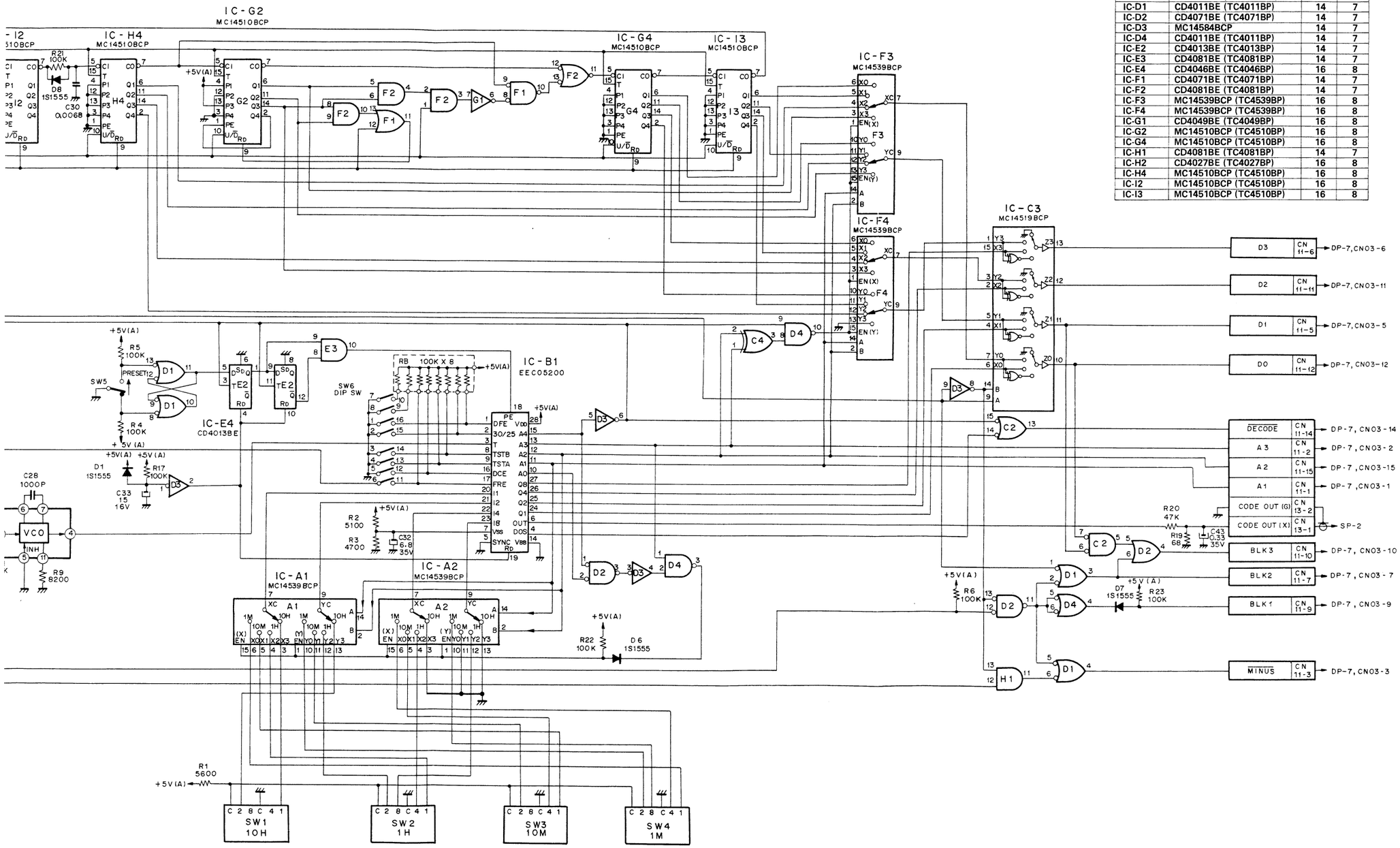


REF. NO.	TYPE	PIN NO.			
		+5V(A)	+5V(B)	+12V	GND
IC-A2	CD4013BE (TC4013BP)	14			7
IC-A3	CD4015BE (TC4015BP)	16			8
IC-A4	CD4015BE (TC4015BP)	16			8
IC-A5	MC14519BCP (μPD4519C)	16			8
IC-A6	CD4015BE (TC4015BP)	16			8
IC-A7	CD4006BE (TC4006BP)	14			7
IC-A8	MC14538BCP	16			8
IC-A9	MC14538BCP	16			8
IC-A10	CD4015BE (TC4015BP)	16			8
IC-A11	CD4015BE (TC4015BP)	16			8
IC-A14	CD4013BE (TC4013BP)	14			7
IC-B1	CD4071BE (TC4071BP)	14			7
IC-B2	CD4049BE (TC4049BP)	16			8
IC-B3	MC14538BCP	16			8
IC-B4	MC14519BCP (μPD4519C)	16			8
IC-B5	MM74C163N	16			8
IC-B6	MM74C163N	16			8
IC-B7	CD4011BE (TC4011BP)	14			7
IC-B8	CD4011BE (TC4011BP)	14			7
IC-B9	SN74LS04N		14		7
IC-B10	SN74LS163N		16		8
IC-B11	SN74LS163N		16		8
IC-B12	SN74LS221N		16		8
IC-B13	SN74LS02N		14		7
IC-C1	CD4011BE (TC4011BP)	14			7
IC-C2	CD4049BE (TC4049BP)	16			8
IC-C3	TL820CN			3,10	2
IC-C4	MC14538BCP	16			8
IC-C5	CD4049BE (TC4049BP)	16			8
IC-C6	CD4013BE (TC4013BP)	14			7
IC-101	μA78L05AV			1	3
IC-102	CX-733 (PS MODEL)			3,10	2
IC-102	CX-732 (NTSC/PM MODEL)			3,10	2

TM-3 BOARD REF. NO. 6,000SERIES
TIMER

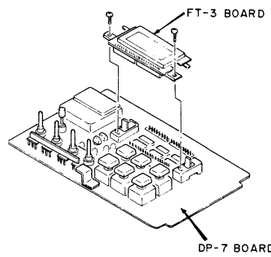


REF. NO.	TYPE	PIN NO.	
		+5V	GND
IC-A1	MC14539BCP (TC4539BP)	16	8
IC-A2	MC14539BCP (TC4539BP)	16	8
IC-B1	EECO5200	28	14
IC-C2	MC14572BCP	16	8
IC-C3	MC14519BCP (μPD4519C)	16	8
IC-C4	CD4070BE (MB84070M)	14	7
IC-D1	CD4011BE (TC4011BP)	14	7
IC-D2	CD4071BE (TC4071BP)	14	7
IC-D3	MC14584BCP	14	7
IC-D4	CD4011BE (TC4011BP)	14	7
IC-E2	CD4013BE (TC4013BP)	14	7
IC-E3	CD4081BE (TC4081BP)	14	7
IC-E4	CD4046BE (TC4046BP)	16	8
IC-F1	CD4071BE (TC4071BP)	14	7
IC-F2	CD4081BE (TC4081BP)	14	7
IC-F3	MC14539BCP (TC4539BP)	16	8
IC-F4	MC14539BCP (TC4539BP)	16	8
IC-G1	CD4049BE (TC4049BP)	16	8
IC-G2	MC14510BCP (TC4510BP)	16	8
IC-G4	MC14510BCP (TC4510BP)	16	8
IC-H1	CD4081BE (TC4081BP)	14	7
IC-H2	CD4027BE (TC4027BP)	16	8
IC-H4	MC14510BCP (TC4510BP)	16	8
IC-I2	MC14510BCP (TC4510BP)	16	8
IC-I3	MC14510BCP (TC4510BP)	16	8



DP-7 DP-7

DP-7 BOARD REF. NO. 7,000SERIES
DISPLAY



FT-3 BOARD

LIQUID CRYSTAL
FRS-4060PCR

IC6 MC14543BCP
IC7 CD4077BE
IC5 MC14543BCP
IC4 MC14543BCP
IC3 MC14543BCP
IC2 MC14543BCP
IC1 MC14543BCP
DRIVER
DECODER 6
DECODER 5
DECODER 4
DECODER 3
DECODER 2
DECODER 1
LATCH
IC8 CD4013BE
IC9 CD4028BE
Q1 2SC403C

TM-3
CN11-12 DO IN
CN11-5 D1 IN
CN11-11 D2 IN
CN11-6 D3 IN
CN11-3 MINUS IN
CN11-9 BLK1 IN
CN11-7 BLK2 IN
CN11-10 BLK3 IN
CN11-1 A1 IN
CN11-15 A2 IN
CN11-2 A3 IN
CN11-14 DECODE IN

CN106 VIDEO IN
SW101 LINE / CAMERA SWITCH
CAMERA,CN102-6
CAMERA,CN102-7
SY-17,CN68-9 LINE
+12V IN
SELECTED VIDEO(X)
SELECTED VIDEO(Y)
VIDEO LEVEL
R12 2700
R13 82
R8 1K
R11 10K
C3 10 25V
C5 47 16V
R9 75
R10 3300
C4 10/25V
D4 RD6.2EB
VIDEO OUT(X)
VIDEO OUT(Y)
MD-9,CN21-8
D5 RD5.1EB
RF-2,CN45-5
MD-9,CN21-6
AU-10,CN73-3
METER RF ENVELOPE
METER VIDEO
METER AUDIO
BATT 8
R14 30K
R15 20K
METER CALIB (BATT)
R16 10K
ME1 AUDIO/VIDEO/RF/BATTERY METER
SW9
AU-10,CN79-6
AU-10,CN79-5
AU-10,CN78-5
CH-1 LINE IN
CH-2 LINE IN
CH-3 LINE IN
GND
SELECTED LINE OUT
AU-10,CN73-2
SY-17,CN68-11 (SV-18)
BATT ALARM IN
R1 220
D1
+5CV
SY-50,CN31-15
L/C ALARM IN
R2 220
D2
D3
LOCK LAMP
REMOTE,CN101-8
MD-9,CN21-5
PEAK LEVEL IN
+5V OUT
SY-17,CN68-10 (SV-18)
+5V IN
REMOTE,CN101-14
SY-17,CN68-12 (SV-18)
REMOTE,CN101-1
SY-50,CN31-16
+5V CV IN
REMOTE,CN101-9
+5CV OUT

SW1 TIME CODE TIMER
R4 10K
TC / TIMER
TM-3,CN11-16
SW2 RESET
RESET
TIMER RESET
TM-3,CN11-8
SY-50,CN31-2
AUDIO CH-1 REC
R5 10KΩ
CH-1 REC VR(1)
CH-1 REC VR(2)
CH-1 REC VR(3)
AU-10,CN80-2
AU-10,CN80-1
AUDIO CH-2 REC
R6 10KΩ
CH-2 REC VR(1)
CH-2 REC VR(2)
CH-2 REC VR(3)
AU-10,CN79-2
AU-10,CN79-1
AUDIO CH-3 REC
R7 10KΩ
CH-3 REC VR(1)
CH-3 REC VR(2)
CH-3 REC VR(3)
AU-10,CN78-2
AU-10,CN78-1

REF. NO.	TYPE	PIN NO.	
		+5V	GND
IC1	MC14538BCP (TC4538BP)	16	8
IC2	MC14538BCP (TC4538BP)	16	8
IC3	MC14538BCP (TC4538BP)	16	8
IC4	MC14538BCP (TC4538BP)	16	8
IC5	MC14538BCP (TC4538BP)	16	8
IC6	MC14538BCP (TC4538BP)	16	8
IC7	CD4077BE (MC14077BCP)	14	7
IC8	CD4013BE (TC4013BP)	14	7
IC9	CD4028BE (TC4028BP)	16	8

SW3 REW
+5V
C2 47 6.3V
+5CV
C1 47 6.3V
REW LED OUT → REMOTE, CN101-15
REW LED IN ← SY-50, CN31-14
REW KEY IN → REMOTE, CN101-2
REW KEY OUT → SY-50, CN31-3

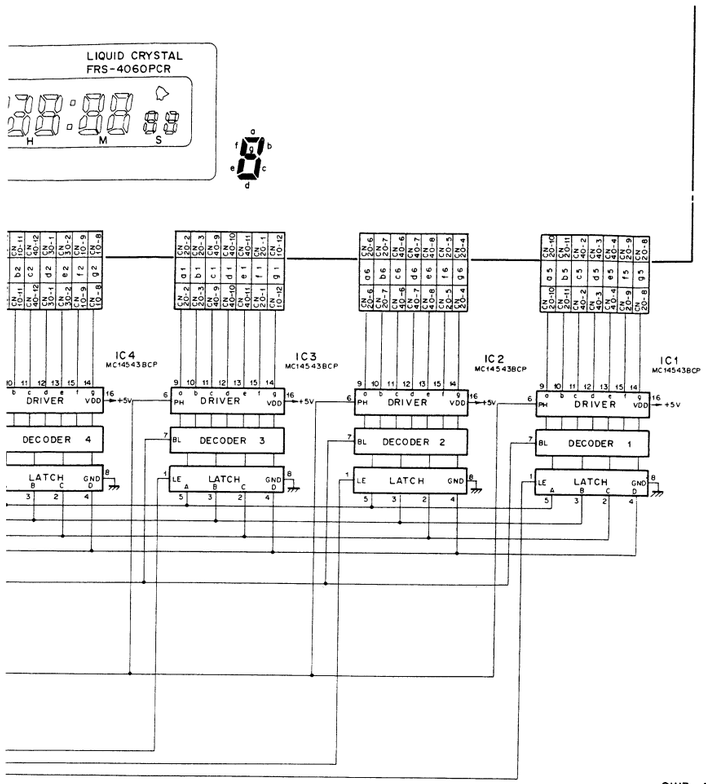
SW4 FF
FF LED OUT → REMOTE, CN101-17
FF LED IN ← SY-50, CN31-12
FF KEY IN → REMOTE, CN101-4
FF KEY OUT → SY-50, CN31-5

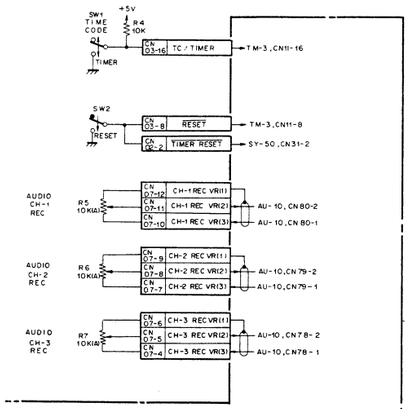
SW5 STBY
STBY LED OUT → REMOTE, CN101-19
STBY LED IN ← SY-50, CN31-10
STBY KEY IN → REMOTE, CN101-6
STBY KEY OUT → SY-50, CN31-7

SW6 STOP
STOP LED OUT → REMOTE, CN101-16
STOP LED IN ← SY-50, CN31-13
STOP KEY IN → REMOTE, CN101-3
STOP KEY OUT → SY-50, CN31-4

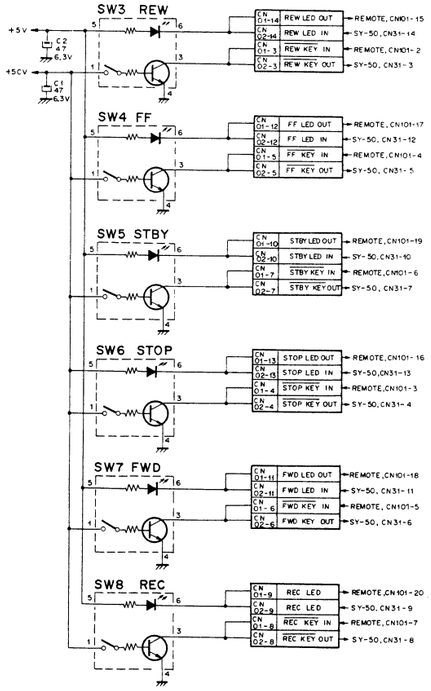
SW7 FWD
FWD LED OUT → REMOTE, CN101-18
FWD LED IN ← SY-50, CN31-11
FWD KEY IN → REMOTE, CN101-5
FWD KEY OUT → SY-50, CN31-6

SW8 REC
REC LED → REMOTE, CN101-20
REC LED ← SY-50, CN31-9
REC KEY IN → REMOTE, CN101-7
REC KEY OUT → SY-50, CN31-8

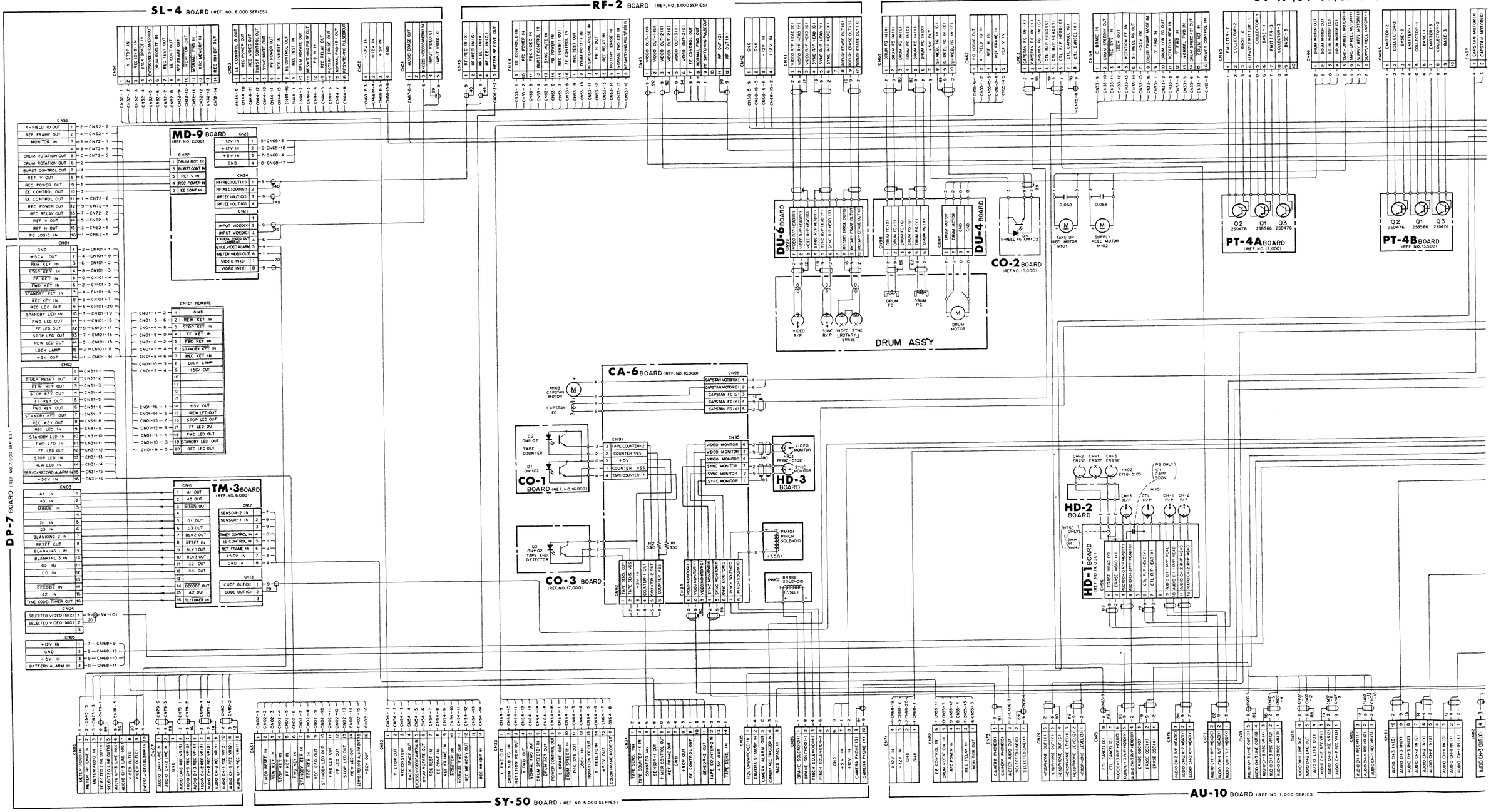


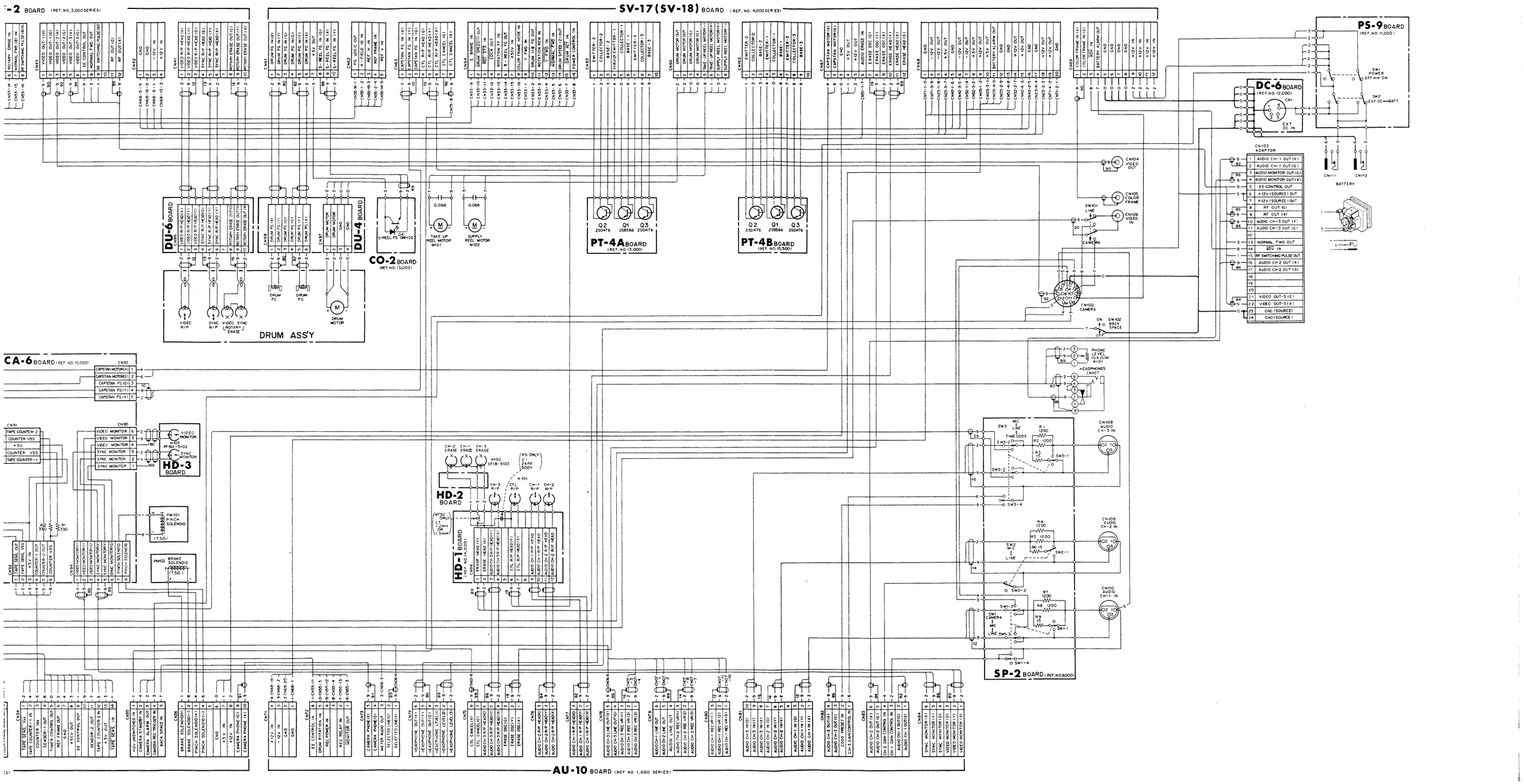


REF. NO.	TYPE	PIN NO.	
		+5V	GND
IC1	MC14538BCP (TC4538BP)	16	8
IC2	MC14538BCP (TC4538BP)	16	8
IC3	MC14538BCP (TC4538BP)	16	8
IC4	MC14538BCP (TC4538BP)	16	8
IC5	MC14538BCP (TC4538BP)	16	8
IC6	MC14538BCP (TC4538BP)	16	8
IC7	CD4077BE (MC14077BCP)	14	7
IC8	CD4013BE (TC4013BP)	14	7
IC9	CD4028BE (TC4028BP)	16	8



FRAME WIRING




-2 BOARD (REF.NO.3,000SERIES)
SV-17(SV-18) BOARD (REF.NO. 4,000SERIES)
DU-6 BOARD
DU-4 BOARD
CO-2 BOARD (REF.NO.15,000)
DRUM ASSY
VIDEO R/P
SYNC R/P
VIDEO (ROTARY) ERASE
DRUM FG
DRUM PG
DRUM MOTOR
S-REEL FG
TAKE UP REEL MOTOR M101
SUPPLY REEL MOTOR M102
0.068
PT-4A BOARD (REF. NO.13,000)
PT-4B BOARD (REF. NO.13,500)
Q2 2SD476
Q1 2SB566
Q3 2SD476
Q1 2SB546
PS-9 BOARD (REF.NO.11,000)
DC-6 BOARD (REF.NO.12,000)
EXT DC IN
SW1 POWER OFF ON
SW2 EXT DC BATT
CN111
CN112
BATTERY
CN103 ADAPTOR
AUDIO CH-1 OUT (X)
AUDIO CH-1 OUT (G)
AUDIO MONITOR OUT (G)
AUDIO MONITOR OUT (X)
EE CONTROL OUT
+12V (SOURCE) OUT
+12V (SOURCE) IN
RF OUT (G)
RF OUT (X)
AUDIO CH-3 OUT (X)
AUDIO CH-3 OUT (G)
NORMAL FWD OUT
RF SWITCHING PULSE OUT
AUDIO CH-2 OUT (X)
AUDIO CH-2 OUT (G)
VIDEO OUT-3 (G)
VIDEO OUT-3 (X)
GND (SOURCE)
CN104 VIDEO OUT
CN105 COLOR FRAME
CN106 VIDEO IN
SW101 LINE CAMERA
CN102 CAMERA
SW102 BACK SPACE
PHONE LEVEL 10K/LIN R101
HEADPHONES CN107
CA-6 BOARD (REF. NO.10,000)
CAPSTAN MOTOR(X)
CAPSTAN MOTOR(G)
CAPSTAN FG(G)
CAPSTAN FG(Y)
CAPSTAN FG(X)
TAPE COUNTER-2
COUNTER VSS
+5V
COUNTER VSS
TAPE COUNTER-1
HD-3 BOARD
VIDEO MONITOR
SYNC MONITOR
PM101 PINCH SOLENOID
PM102 BRAKE SOLENOID
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CH-2 ERASE
CH-1 ERASE
CH-3 ERASE
CH-3 R/P
CTL R/P
CH-1 R/P
CH-2 R/P
NTSC ONLY
PS ONLY
SP-2 BOARD (REF.NO.8,000)
MIC LINE TIME CODE
CN108 AUDIO CH-3 IN
CN109 AUDIO CH-2 IN
CN110 AUDIO CH-1 IN
SW2 MIC LINE
SW1 CAMERA MIC LINE
AU-10 BOARD (REF NO 1,000 SERIES)

SONY

PORTABLE VIDEOCORDER

BVH-500PS

SUPPLEMENT-6

SUBJECT

1. ELECTRICAL ALIGNMENT (Section 10, 11 and 12)
2. BLOCK DIAGRAM (Section 13)

Please file this supplement to your personally owned manual (1st Edition), and replace the "TABLE OF CONTENTS" with attached one.

OPERATION AND MAINTENANCE MANUAL

9-966-474-82

Sony Corporation

1981.2 0902.6-1

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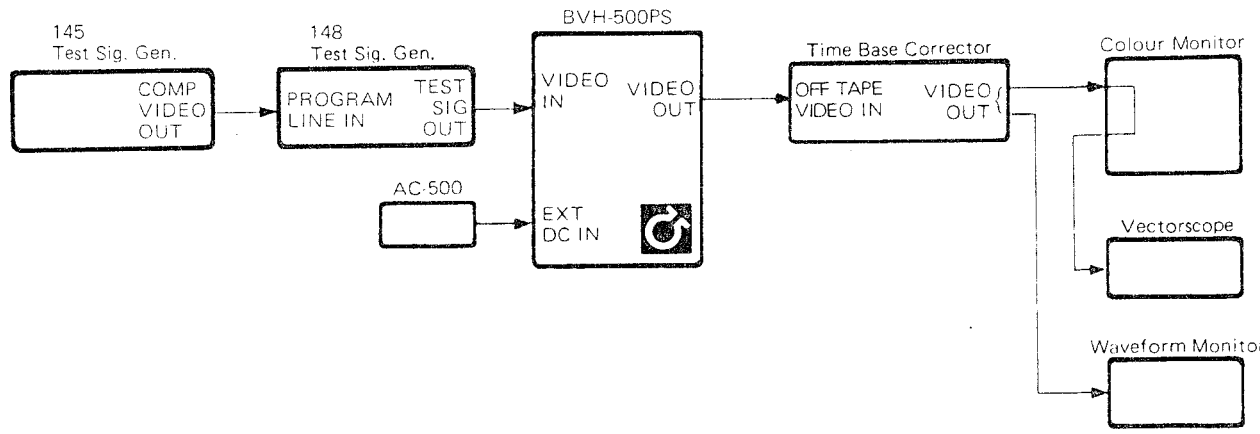
SECTION 10
VIDEO SYSTEM ALIGNMENT

10-1. EQUIPMENT REQUIRED

1. Oscilloscope
2. Test Signal Gen.
3. Vectorscope
4. Waveform Monitor
5. Spectrum Analyzer
6. Colour Monitor
7. Sine wave Oscillator
8. Frequency Counter
9. Digital Voltmeter
10. Time Base Corrector

10-2. CONNECTION



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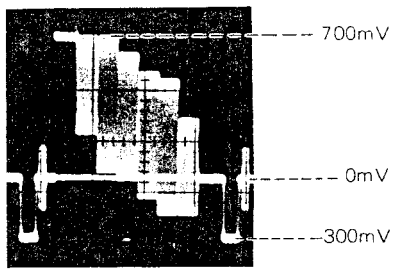
- 10-29. RF LEVEL ADJUSTMENT
- 10-30. RF METER CALIBRATION

10-4. PREPARATION FOR VIDEO SYSTEM ALIGNMENT

10-4-1. Colour Bar Signal

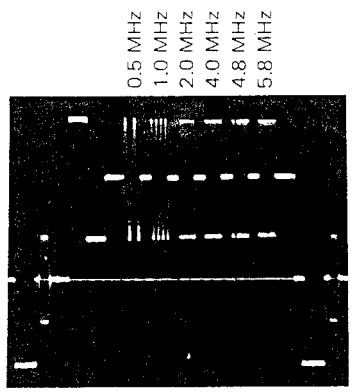
Set the WHITE REF and AMPL switches on the REK 145 as follows.

WHITE REF : 100%
AMPL : 75%



10-4-2. Multiburst Signal

Set the MULTIBURST AMPLITUDE Selector on the TEK 148 to 420mV.



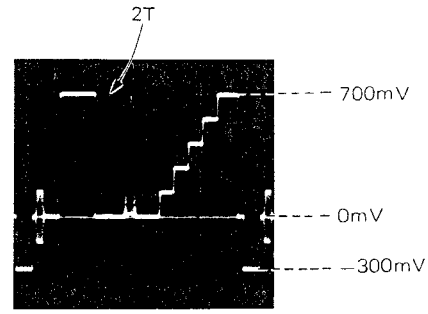
10-4-3. Line 17 Signal

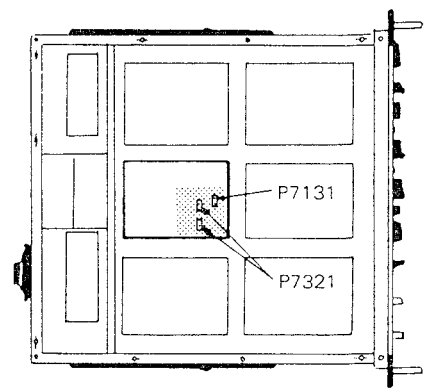
T and 2T pulses are provided and selected by internal connection of TEK 148. Select 2T as shown below.

(1) Remove the top panel of the TEK 148

(2) Change the connector on pins 2 and 3 of P7131 to pins 1 and 2.

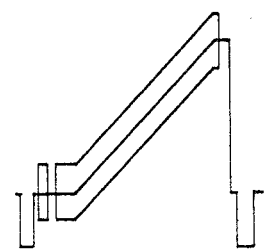
(3) Change the connector on pins 4 and 5 of P7321 to pins 5 and 6.





10-4-4. Ramp Linearity Signal

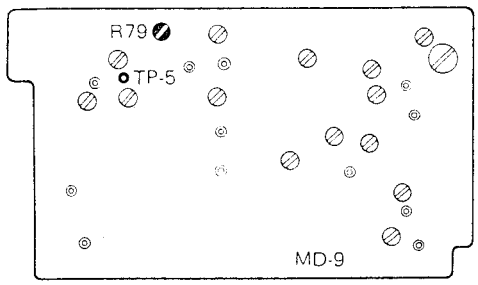
SUBCARRIER AMPLITUDE = 280mV



10-5. –5.2 V ADJUSTMENT

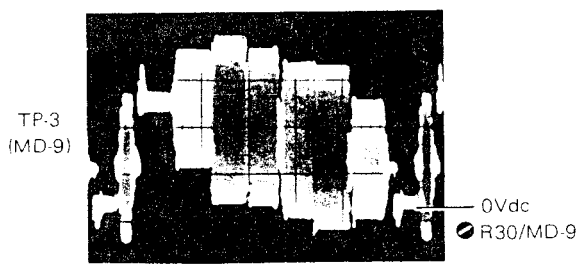
VTR MODE : STANDBY
EQUIPMENT : Digital Voltmeter (DC)

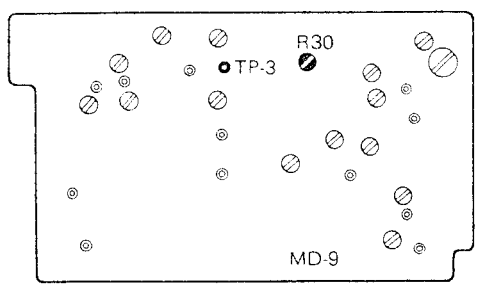
⊘ R79/MD-9 Board: TP-5 = –5.2 V ± 0.1 Vdc



10-6. SYNC-TIP CLAMP ADJUSTMENT

VTR MODE : STANDBY
EQUIPMENT : Oscilloscope
SIGNAL SOURCE : COLOUR BAR

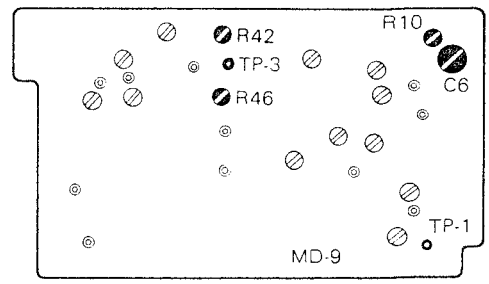




10-7. DG COMPENSATOR ADJUSTMENT

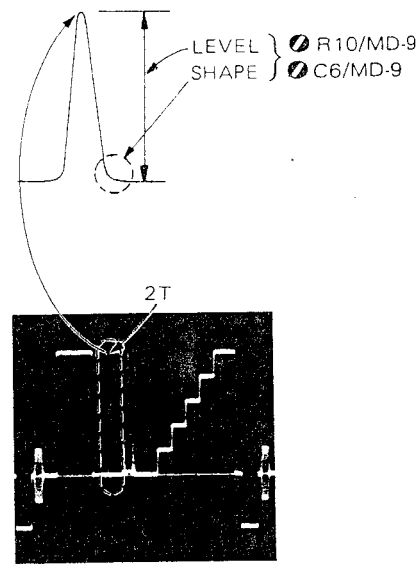
VTR MODE : STANDBY
EQUIPMENT : Vectorscope
SIGNAL SOURCE : RAMP LINEARITY

⊘ R42
⊘ R46
} MD-9 : DG < 1%
: DP < 1°



10-8. VIDEO AMP FREQ. RESP. ADJUSTMENT

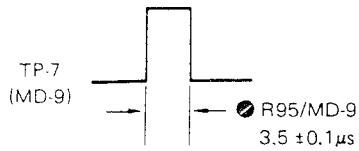
VTR MODE : STANDBY
EQUIPMENT : Oscilloscope
SIGNAL SOURCE : LINE 17 SIGNAL

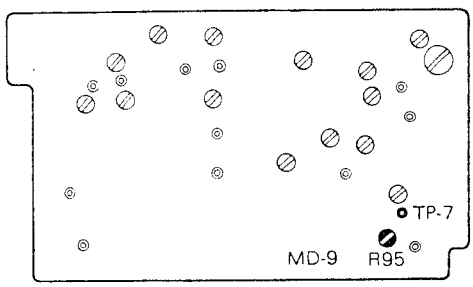
1. Remove R37 from the MD-9 board.
2. Connect scope CH-1 to TP-1 and CH-2 to TP-3.
3. Adjust CH-1 vertical gain so that level of 2T bar is equal to that of CH-2.
4. 

5. After adjustment, place R37 on the same position.

10-9. BURST GAIN-UP PULSE WIDTH ADJUSTMENT

VTR MODE : STANDBY
EQUIPMENT : Oscilloscope
SIGNAL SOURCE : COLOUR BAR

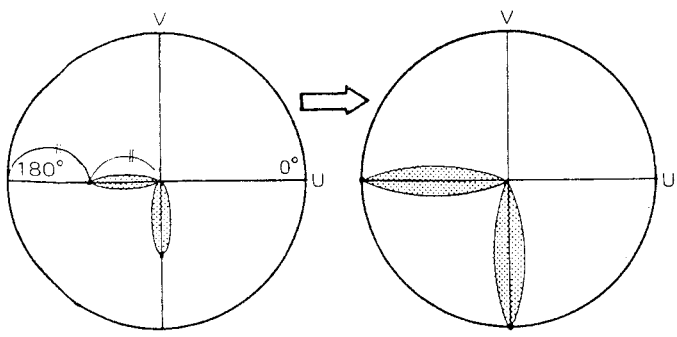




10-10. BURST LEVEL AND PHASE ADJUSTMENT

VTR MODE : STANDBY
EQUIPMENT : Oscilloscope
Vectorscope (EXT CW LOCK)
SIGNAL SOURCE : ANY SIGNAL

1. Connect scope to TP-3 on the MD-9 board.
2. Connect vectorscope to VIDEO OUT connector.
3. In order to inactive the burst doubler, connect TP-7 and E-1 on the MD-9 board with jumper.
4. Adjust scope VAR GAIN control to obtain the burst level on the scope for 3cm.
5. Adjust GAIN and PHASE controls of vectorscope to obtain one of the burst peak appearing on the 180° U-AXIS and also midway of the radius, as shown below.
6. Remove the jumper.
7. Adjust R21 (GAIN) and L1 (PHASE) to obtain the burst on the scope for 6cm and 180° axis on the vectorscope.



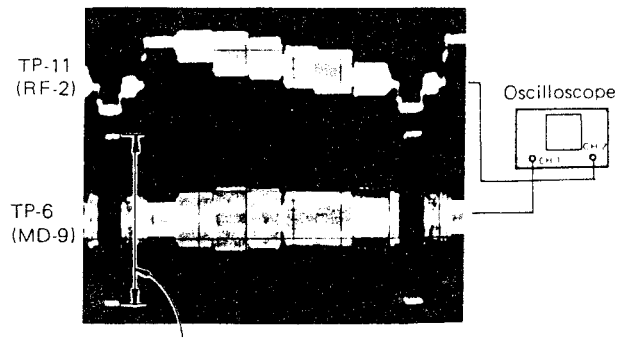
L1/MD-9: PHASE
R21/MD-9; GAIN

10-11. LPF AND DEVIATION ADJUSTMENT

A. When the spectrum analyzer is not available.

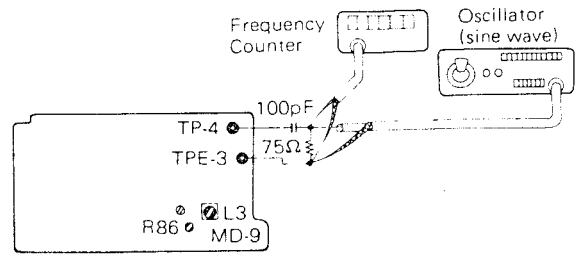
VTR MODE : STANDBY
EQUIPMENT : 1. Oscilloscope
2. Oscillator (sine wave)
3. Frequency Counter
SIGNAL SOURCE : LINE 17 SIGNAL
COLOUR BAR

1. Connect channel-1 of scope to TP-6 on the MD-9 board and connect channel-2 of scope to TP-11 on the RF-2 board and set scope to ALT mode, then adjust R86 for maximum sync tip level.

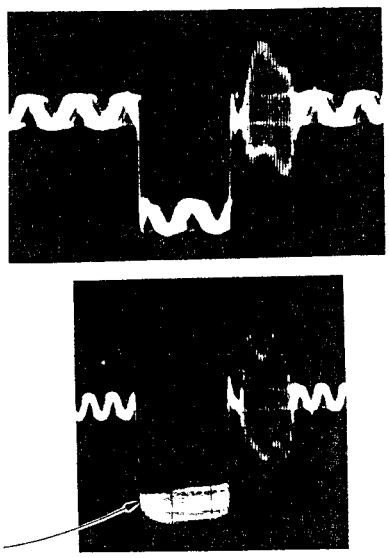


R86: MAXIMUM

2. Adjust sync tip level at TP-6 for 6cm by scope VAR GAIN control.
3. Set oscillator frequency to 7.16 MHz using frequency counter and then connect oscillator output to TP-4 on the MD-9 board as shown below.

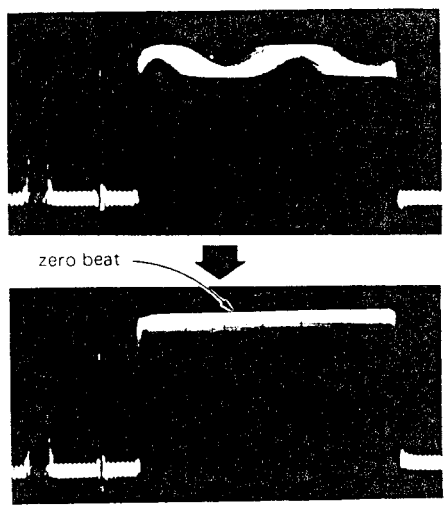


4. Adjust attenuator of oscillator to obtain a beat waveform appeared on the scope as shown.
5. Adjust R86 and L3 for:
CH-2: zero beat at sync tip
CH-1: sync tip level for 4cm
6. Remove channel-2 of scope probe from TP-6 on the MD-9 board.
7. Fine adjust R86 for zero beat at sync tip.



VTR MODE : STANDBY
EQUIPMENT : 1. Oscilloscope
2. Oscillator (sine wave)
3. Frequency Counter
SIGNAL SOURCE : LINE 17 SIGNAL

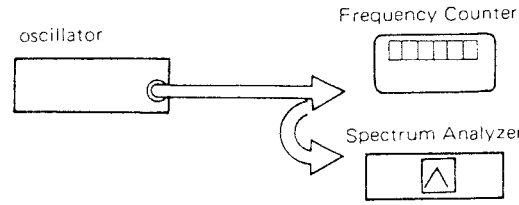
1. Connect scope to TP-11 on the RF-2 board or VIDEO OUT connector with 75-ohm termination.
2. Set oscillator frequency to 8.9 MHz using frequency counter and then connect oscillator output to TP-4 on the MD-9 board.
3. Adjust oscillator attenuator control to obtain a beat waveform appeared on the scope as shown below.
4. Adjust INPUT VIDEO Level Control on the Function Control Panel for zero beat at white peak as shown below.
5. After adjustment, perform section 10-12. LEVEL METER CALIBRATION.

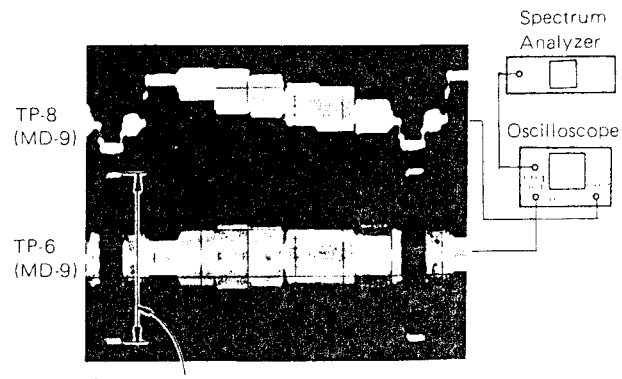


B. When the spectrum analyzer is available.

VTR MODE : STANDBY
EQUIPMENT : 1. Spectrum Analyzer (via scope)
2. Oscilloscope (EXT TRIG from TP-8/MD-9)
3. Oscillator (sine wave)
4. Frequency Counter
SIGNAL SOURCE : COLOUR BAR

1. Set oscillator frequency to 7.16 MHz and then feed oscillator output to spectrum analyzer.
2. Perform spectrum analyzer calibration.



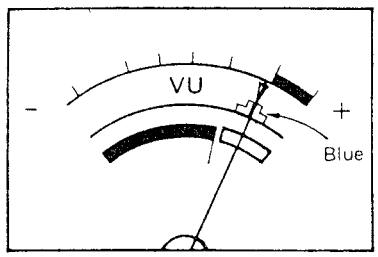


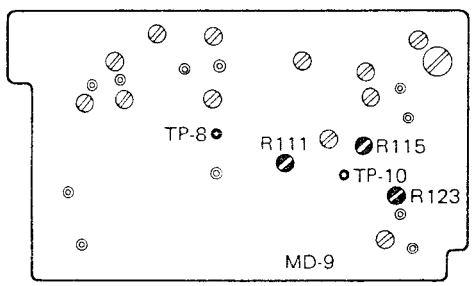
3. Connect channel-1 to TP-6 and channel-2 to TP-8 on the MD-9 board respectively and set scope to ALT mode, then adjust R86 for maximum sync tip level.
4. Adjust sync tip level at TP-6 for 6 cm by scope VAR GAIN control.
5. Adjust R86 and L3 alternately to obtain 4 cm at sync tip portion and proper sync tip frequency on the spectrum analyzer.
6. Connect channel-1 to TP-4 on the MD-9 board and confirm that the sync tip frequency on the spectrum analyzer comes to centre. If it is not; due to effects of probe stray capacity; adjust R86 on the MD-9 board to obtain optimum sync tip frequency on the spectrum analyzer.
7. Set oscillator frequency to 8.9 MHz and then feed oscillator output to spectrum analyzer.
8. Perform spectrum analyzer calibration.
9. Connect channel-1 to TP-4 on the MD-9 board and adjust VIDEO INPUT Level Control to obtain optimum white peak frequency on the spectrum analyzer.
10. After adjustment, perform section 10-12. LEVEL METER CALIBRATION.

10-12. LEVEL METER CALIBRATION

VTR MODE : STANDBY
SIGNAL SOURCE : COLOUR BAR
METER/PHONE select : INPUT VIDEO position

1. ⊘R111/MD-9 : TP-8 = 0.8 ± 0.1 Vp-p
2. ⊘R115/MD-9 : TP-10 = 0.7 ± 0.05 Vdc
3. ⊘R123/MD-9 : Blue Zone Center





10-13. MODULATOR BALANCE ADJUSTMENT

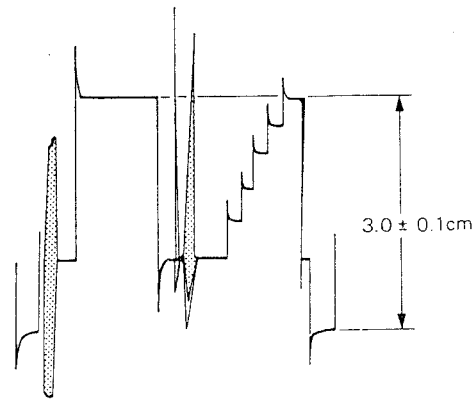
VTR MODE : STANDBY
EQUIPMENT : SPECTRUM ANALYZER
(VIA OSCILLOSCOPE CH-1 OUT)
SIGNAL SOURCE : 50% WHITE

1. Connect scope to TP-4 on the MD-9 board.
2. Adjust R56 for minimum 16.55 MHz spectrum.

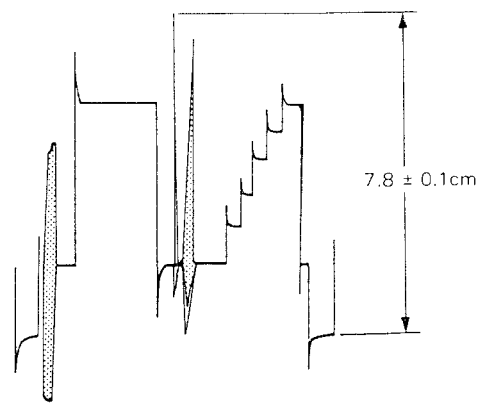
10-14. EXCESS VIDEO ALARM SENSITIVITY ADJUSTMENT

VTR MODE : STANDBY
EQUIPMENT : Oscilloscope (INPUT: DC mode)
(EXT TRIG from TP-9)
SIGNAL SOURCE : LINE 17 SIGNAL

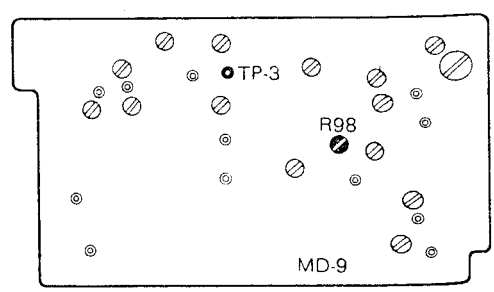
1. Connect scope to TP-3 on the MD-9 board
2. Adjust VAR GAIN control of scope for 3.0 ± 0.1 cm on the scope screen as shown below.



3. Adjust INPUT VIDEO level control for 6.3 ± 0.1 cm as shown below.

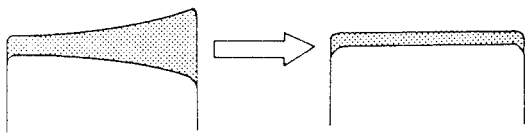


4. Adjust R98 on the MD-9 board for just light-up the Excess Video Alarm Lamp.

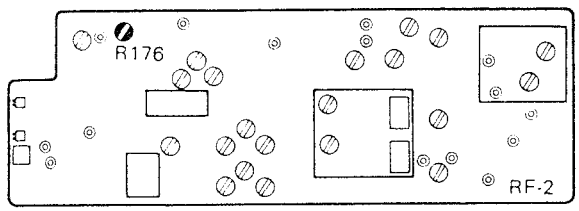


10-15. DEMODULATOR LIMITER BALANCE ADJUSTMENT

VTR MODE : STANDBY
EQUIPMENT : Vectorscope (DG mode)
SIGNAL SOURCE : RAMP LINEARITY

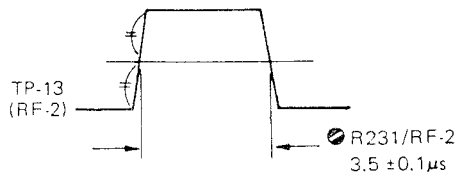


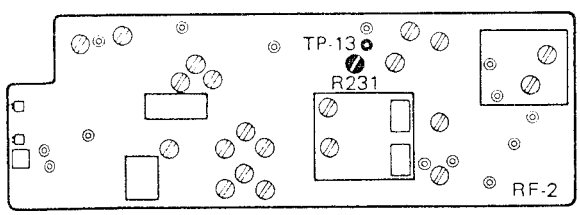
● R176/RF-2



10-16. BURST GAIN DOWN PULSE WIDTH ADJUSTMENT

VTR MODE : STANDBY
EQUIPMENT : Oscilloscope





10-17. BURST LEVEL ADJUSTMENT

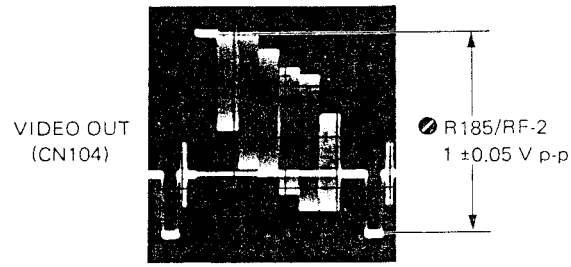
VTR MODE : STANDBY
EQUIPMENT : Oscilloscope

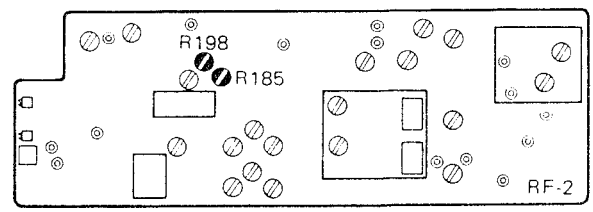
1. Connect a jumper between TP-13 and TPE on the RF-2 board.
2. Connect scope to TP-11 on the RF-2 board.
3. Adjust the burst level by VAR GAIN control of scope to obtain 6 cm on the scope screen.
4. Remove a jumper and then adjust R198 to obtain the burst level for 3 cm on the scope screen.

10-18. VIDEO OUTPUT LEVEL ADJUSTMENT

VTR MODE : STANDBY
EQUIPMENT : Oscilloscope
SIGNAL SOURCE : COLOUR BARS

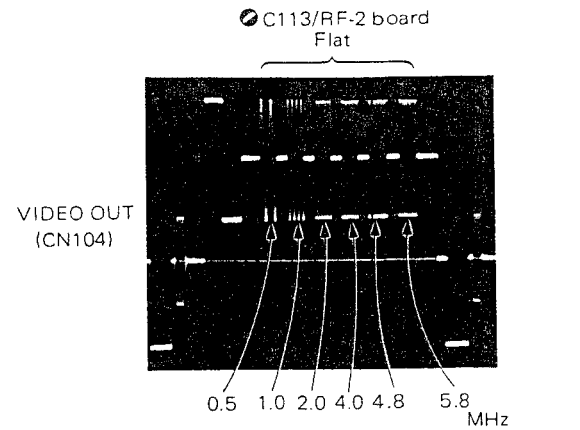
Connect scope to VIDEO OUT connector (CN104) with 75-ohm termination.

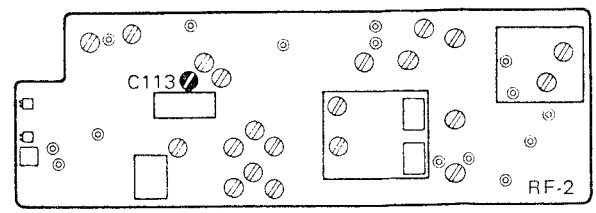




10-19. VIDEO OUTPUT FREQ. CHARA. ADJUSTMENT

VTR MODE : STANDBY
EQUIPMENT : Waveform Monitor
SIGNAL SOURCE : MULTIBURST

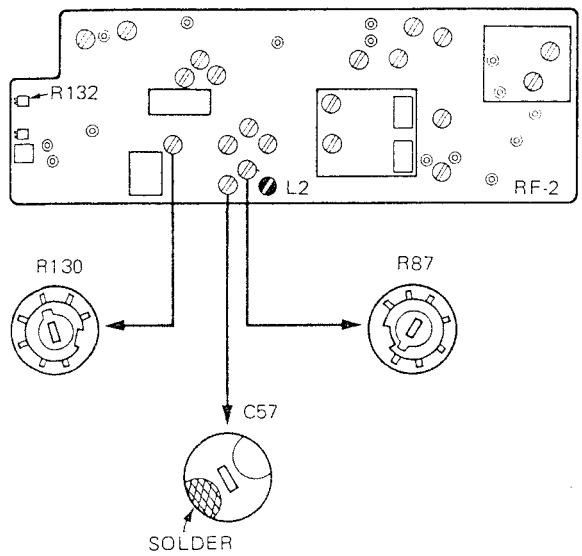




10-20. PB RF FQ AND EQ ADJUSTMENT

VTR MODE : PLAY (REC INHIBIT SW: ON)
EQUIPMENT : 1. Vectorscope
2. Waveform Monitor
3. Spectrum Analyzer
SIGNAL SOURCE : RAMP LINEARITY } use Alignment
MULTIBURST } Tape
MOIRE SIGNAL . . . Refer to step 10.

1. Set following controls as shown below.



2. Play back the RAMP LINEARITY portion of Alignment Tape, and adjust ⊘ L2 as follows.
Spec.: DG = 4%
DP = 4°
⊘ L2

If not, turn ⊘ C57 a little, then repeat ⊘ L2 adjustment.

- When the DG and DP are not satisfied the specifications even if porformed above adjustment. Turn ⊘ R87 a little, then repeat to adjust ⊘ L2 and ⊘ C57 again.

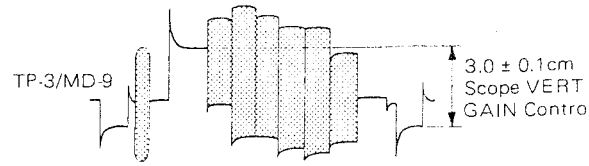
3. Set the Time Base Corrector to BYPASS mode, and play back the MULTIBURST portion of Alignment Tape.

4. Adjustment (Frequency Response)
Spec.: 0.5 ~ 4.8 MHz = Flat
⊘ R132
(4.8 MHz = 100 ± 5%, Ref to 0.5 MHz)

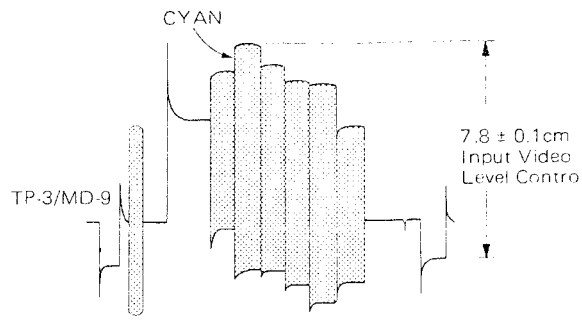
5. Set the Time Base Corrector to NORMAL mode, and make sure the DG and DP while playing back the RAMP LINEARITY portion of Alignment tape. When the DG and DP are out of specifications, repeat the adjustment from step 2 until the DG, DP and frequency response are satisfied the specifications.

6. After completion of step 2 through step 5, performing the following overmodulation check.

7. Connect scope to TP-3 on the MD-9 board, and set the sync-tip to white amplitude for 3.0 ± 0.1cm by scope VART GAIN control.

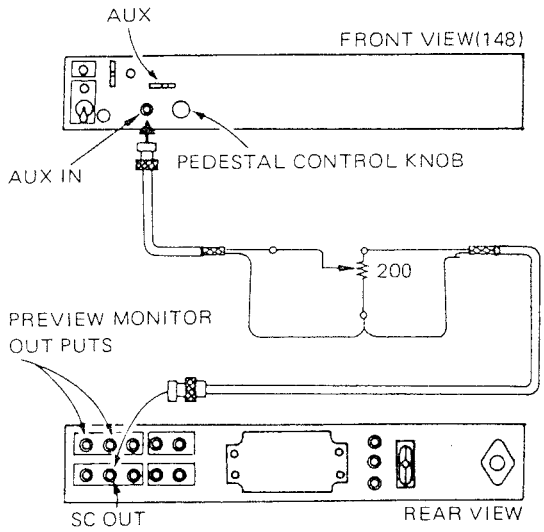


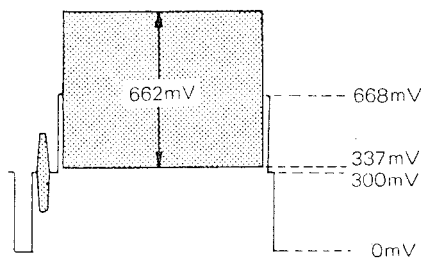
8. Adjust the sync-tip to cyan amplitude for 7.8 ± 0.1cm by Input Video Level control, and record it about 1 minute.



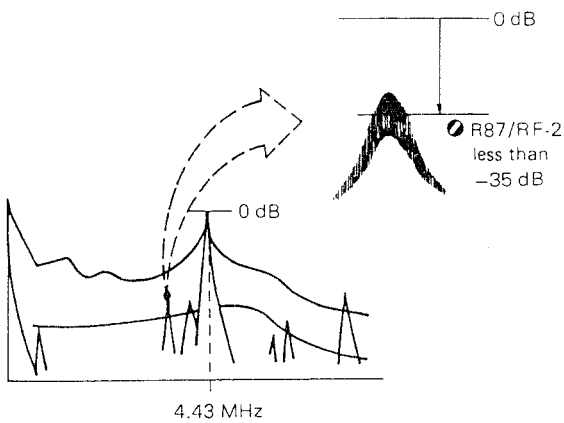
9. Play it back, and observe the cyan portion of picture. When the overmodulation will occurs, turn ⊘ R87 to CCW direction a very little, then repeat adjustment from step 2.

10. Record a MOIRE test signal as follow.
Prepare a resistor network as shown below. Purpose of this network is the attenuation for subcarrier.
Feed a TEK 148 CW SUBCARRIER Signal Output to AUX IN through the attenuator.
Set the REMOTE/AUX/LOCAL switch to AUX.
The MOIRE test signal is present at PREVIEW MONITOR OUTPUTS on the rear panel.
Adjust 200-ohm potentiometer for amplitude and AUXILIARY PEDESTAL for set-up and obtain the MOIRE test signal as shown.





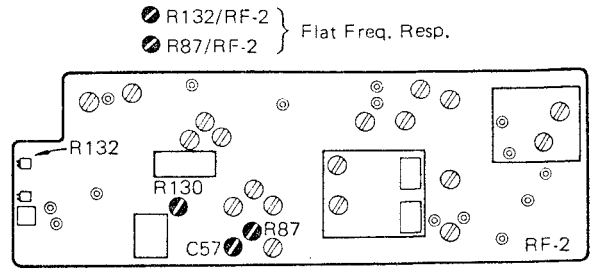
11. Play back the MOIRE recorded portion.



12. Play back the RAMP LINEARITY portion of alignment tape.

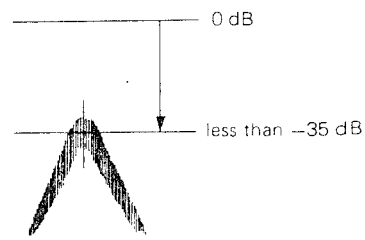
R87/RF-2: Minimum DP
R130/RF-2: Minimum DG

13. Play back the MULTIBURST portion of alignment tape.



14. Repeat step 7.

15. Play back the MOIRE recorded portion.



16. Play back the RAMP LINEARITY portion of alignment tape, then confirm that DG and DP.
DG: less than 4%
DP: less than 4°

- If not, repeat steps 12 and later.

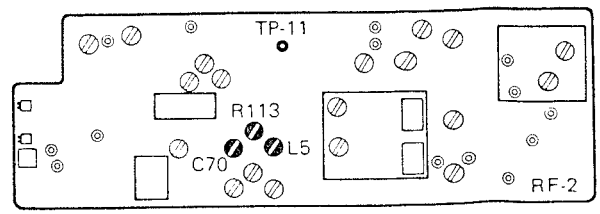
10-21. SYNC CHANNEL FQ ADJUSTMENT

VTR MODE	:	PLAY
EQUIPMENT	:	Oscilloscope or waveform monitor
SIGNAL SOURCE	:	Any Signal with Burst (use Alignment tape)

1. Connect waveform monitor to VIDEO OUT connector (or connect scope to TP-11 on the RF-2 board) then select LINE-15.

2. R113, L5, C70 } RF-2 board:

SYNC Channel Burst = VIDEO Channel Burst

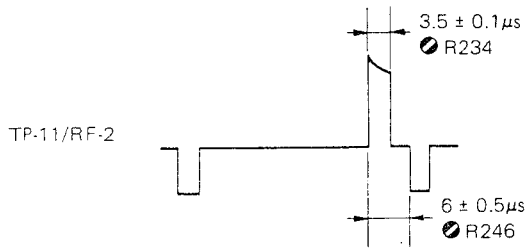


10-22. PB H TIMING ADJUSTMENT

VTR MODE : PLAY
EQUIPMENT : Oscilloscope (EXT TRIG: TP-14)
SIGNAL SOURCE : Any Signal (use Alignment tape)

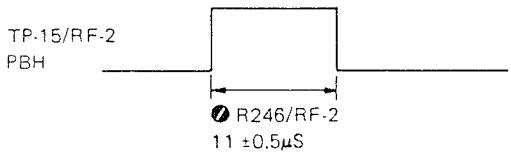
Observe on line-16 or line-329 SYNC and VIDEO switching position.

A. Board No.; 1-588-157-11

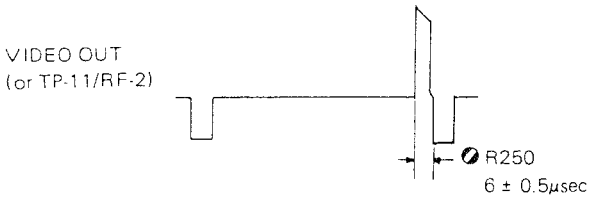


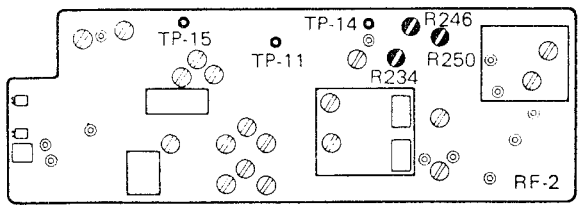
B. Board No.; 1-588-157-12 and UP

1. Adjust R246 as shown below.



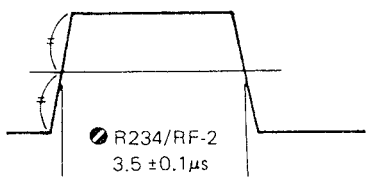
2. Adjust R250 as shown below.

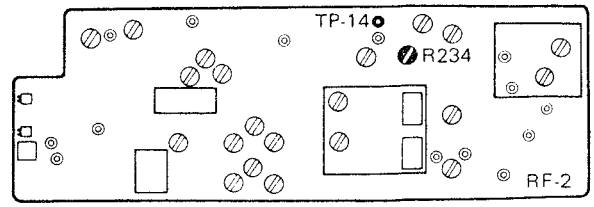




10-23. RF SWITCHING NOISE SUPPRESSOR ADJUSTMENT

VTR MODE : PLAY
EQUIPMENT : Oscilloscope
SIGNAL SOURCE : Any Signal (use Alignment tape)

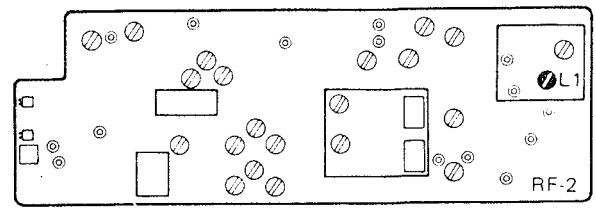




10-24. ROTARY ERASE FREQUENCY ADJUSTMENT

VTR MODE : RECORD
EQUIPMENT : Frequency Counter
SIGNAL SOURCE : COLOUR BAR

L1/RF-2 : TP-1 = 16.0 ±0.2MHz

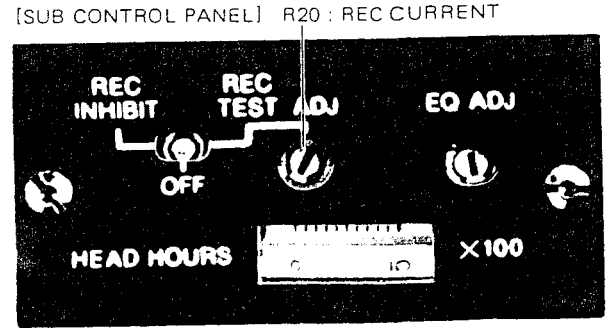


10-25. ROTARY ERASE CURRENT ADJUSTMENT

VTR MODE : RECORD←→PLAY
EQUIPMENT : 1. Oscilloscope
2. Spectrum Analyzer
SIGNAL SOURCE : COLOUR BAR

1. Connect scope to TP-10 on the RF-2 board and then connect spectrum analyzer to SIGNAL OUT of scope.
2. Record a COLOUR BAR for two minutes.
3. Play it back then set the sync tip level for 0 dB on the spectrum analyzer.
4. Memorize a mechanical position of R20 (REC CURRENT) as shown below.

[SUB CONTROL PANEL] R20 : REC CURRENT

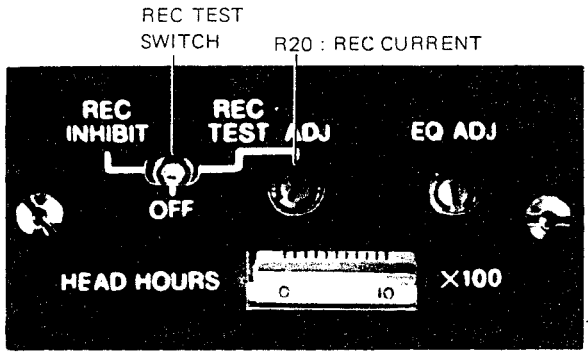


5. Turn R20 fully counterclockwise and make recording for 10 seconds.
6. Play it back then measure the sync tip level.
   Spec.: less than −46 dB
7. If it is out of specifications, turn R8 CCW a little, then repeat above steps until it satisfies the specifications.
8. After adjustment, reset R20 for memorized position.

10-26. RECORD CURRENT ADJUSTMENT

VTR MODE : REC TEST
SIGNAL SOURCE : COLOUR BAR
METER/PHONE select: RF position
REC TEST switch : TEST position

1. Set the machine in the REC TEST mode.
2. Adjust R20 (REC CURRENT) on the Sub Control Panel to obtain maximum meter needle deflection.

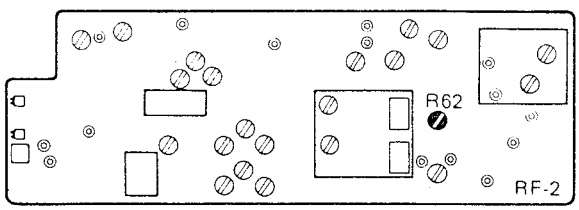


(SUB CONTROL PANEL BLOCK)

10-27. SYNC CHANNEL RECORD AMP FREQ RESP ADJUSTMENT

VTR MODE : RECORD ⟶ PLAY
EQUIPMENT : Oscilloscope or Waveform Monitor
SIGNAL SOURCE : COLOUR BAR

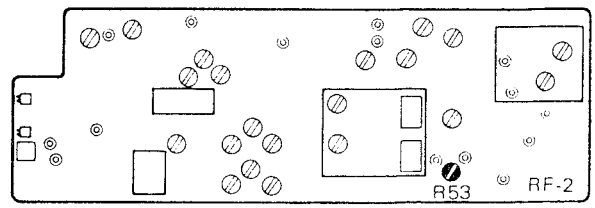
1. Connect waveform monitor or oscilloscope to VIDEO OUT connector.
2. Record and play back a COLOUR BAR signal.
3. Slightly adjust ◐R62 on the RF-2 board to obtain equal burst levels on the sync channel and video channel.
4. Record and play back again and confirm the burst level of the both channels.



10-28. VIDEO CHANNEL RECORD AMP FREQ. RESP. ADJUSTMENT

VTR MODE RECORD ⟷ PLAY
EQUIPMENT 1. Oscilloscope or Waveform Monitor
2. Vectorscope

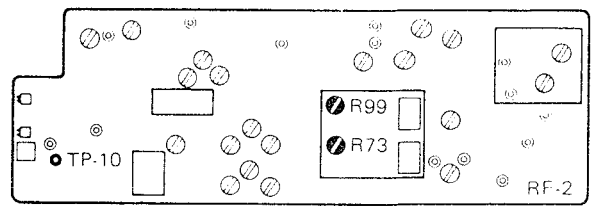
1. Connect waveform monitor or oscilloscope to VIDEO OUT connector.
2. Record and play back a MULTIBURST Signal.
3. In case of incorrect high frequency response, slightly adjust R53 on the RF-2 board. Record and play back a MULTIBURST then comfirm the frequency response.
4. Record and play back a RAMP LINEARITY so that confirm DG and DP
   DG: less than 4%
   DP: less than 4°



10-29. RF LEVEL ADJUST

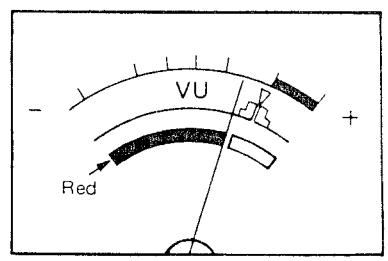
VTR MODE RECORD ⟶ PLAY
SIGNAL SOURCE COLOUR BAR

1. Connect scope to TP-10 on the RF-2 board.
2. ◐R73 (VIDEO) ◐R99 (SYNC) } RF-2 Baord: 0.6 Vp-p

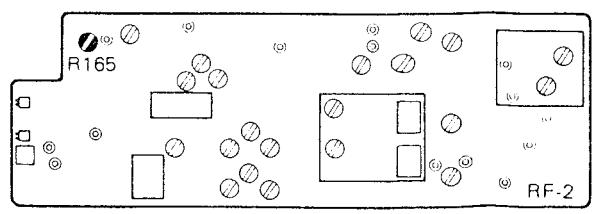


10-30. RF METER CALIBRATION

VTR MODE : RECORD ⟷ PLAY
METER/PHONE select: RF position
SIGNAL SOURCE : COLOUR BAR



◐R165/RF-2 Baord: right edge of red zone

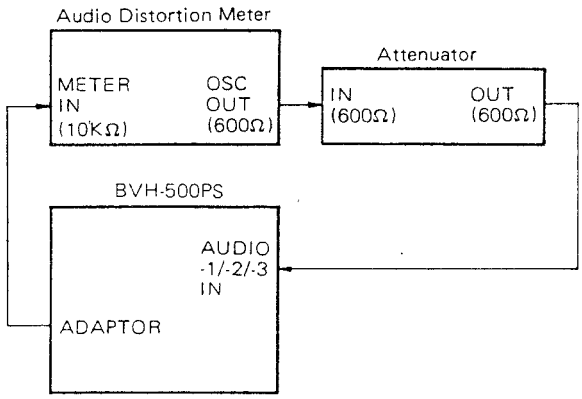


SECTION 11
AUDIO SYSTEM ALIGNMENT

11-1. EQUIPMENT REQUIRED

1. Oscilloscope
2. Frequency Counter
3. Audio Distortion Meter
4. Wow And Flutter Meter
5. Attenuator (600Ω)

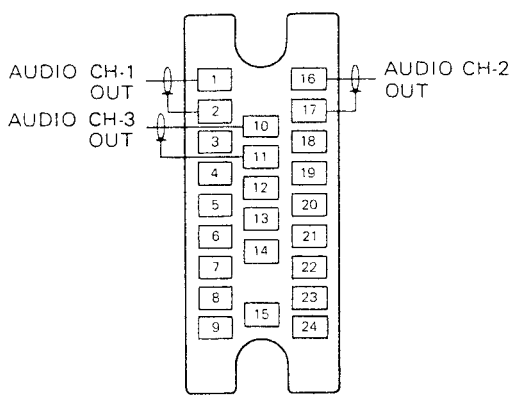
11-2. CONNECTION

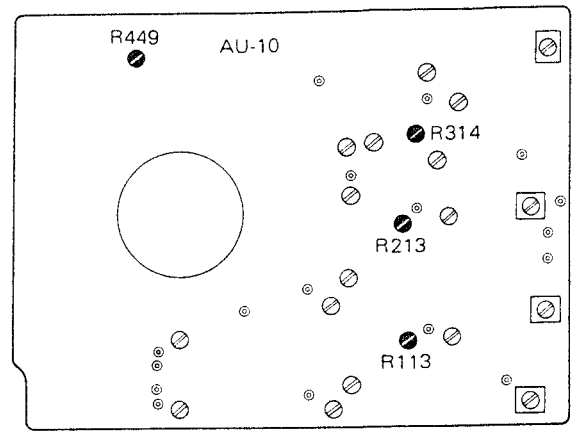


11-3. METER CALIBRATION

VTR Mode : STANDBY
Signal Source : 1kHz, 0VU (8 dBm)
METER/PHONE Select : AUDIO CH-1 (CH-2/CH-3)

1. Feed a 1kHz/+8 dBm reference signal to AUDIO CH-1 (CH-2/CH-3) IN.
2. Adjust AUDIO REC control on the Function Control Panel for a audio output of −10 dBs at the ADAPTOR connector.
3. Connect distortion meter to each audio output and adjust R449 on the AU-10 board for a level meter deflection of 0VU.





11-4. PB LEVEL ADJUSTMENT

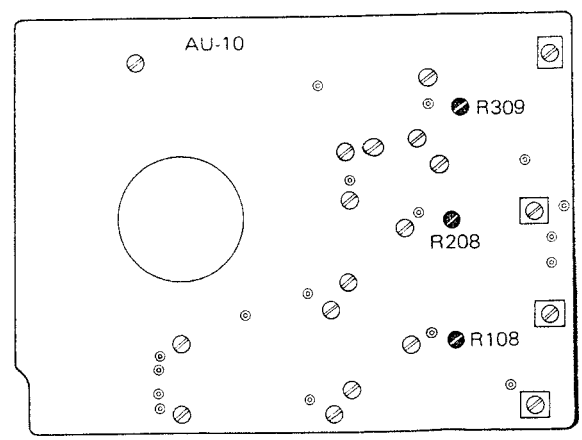
VTR Mode : PLAY (use Alignment Tape)

1. Playback a 1kHz/REFERENCE portion of alignment tape.
2. Adjust R113 (CH-1), R213 (CH-2) and R314 (CH-3) for an audio output level of −10 dBs at the ADAPTOR connector.

11-5. PB EQUALIZER ADJUSTMENT

VTR Mode : PLAY (use Alignment Tape)

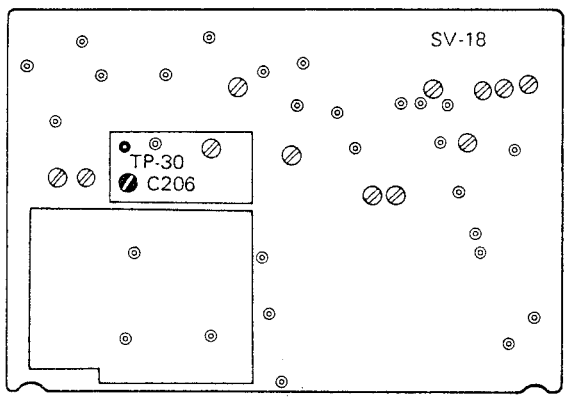
1. Playback a frequency response portion of the alignment tape.
2. Adjust R108 (CH-1), R208 (CH-2) and R309 (CH-3) for a frequency response of 50 to 15,000Hz $^{+1.5}_{-3.0}$ dB.
   - Change the value of R110 (CH-1), R210 (CH-2) and R311 (CH-3) if low frequency response is out of specifications.



11-6. ERASE OSCILLATOR FREQUENCY ADJUSTMENT

VTR Mode : RECORD
Equipment : Frequency Counter (Via Oscilloscope)

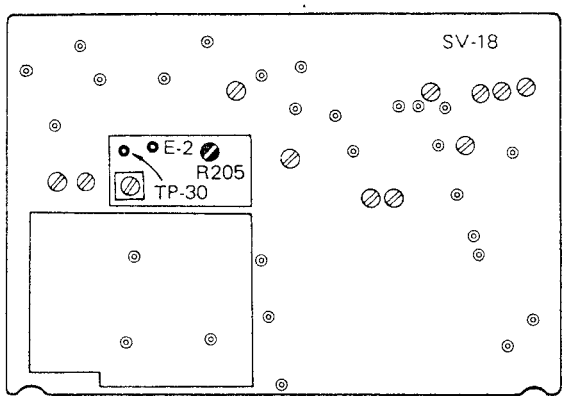
● C206 : TP-30 = 140.0 ±0.1kHz



11-7. ERASE OSCILLATOR LEVEL ADJUSTMENT

VTR Mode : RECORD
Equipment : Oscilloscope

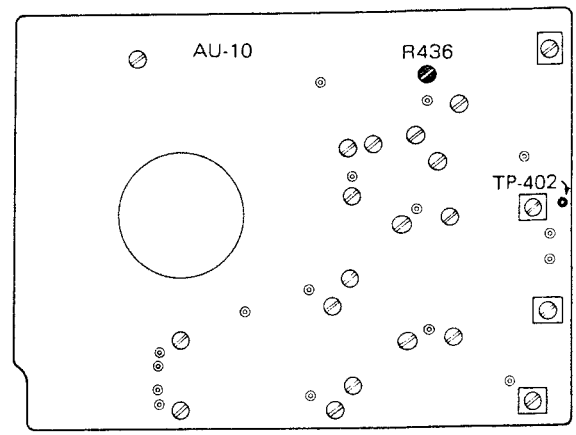
1. ● R205 : TP-30 = 370 ±10mVp-p
2. After adjustment, confirm that the oscillating frequency.
   - If it is out of specification, repeat section 11-6.



11-8. BIAS OSCILLATOR LEVEL ADJUSTMENT

VTR Mode : RECORD
Equipment : Oscilloscope

● R436 : TP402 / TPE-3 = 280 ±10Vp-p



11-9. BIAS OSCILLATOR TUNING

VTR Mode : RECORD
Equipment : Oscilloscope (DC mode)

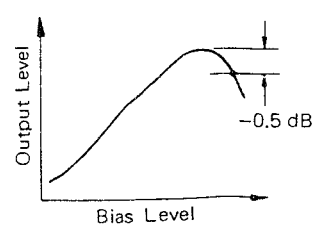
● C414/AU-10 : TP-401 = minimum voltage (less than 8Vdc)

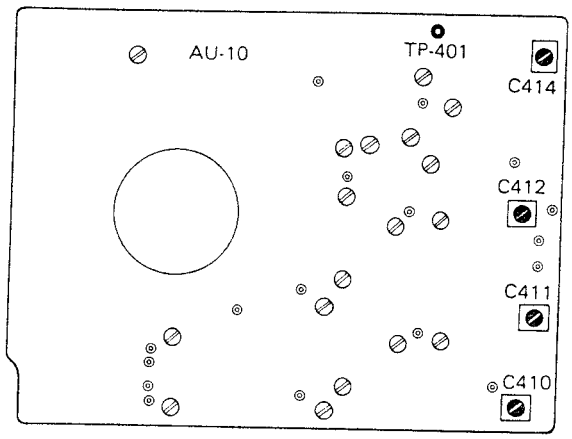
11-10. BIAS LEVEL ADJUSTMENT

VTR Mode : RECORD ⟷ PLAY
Equipment : Distortion Meter

1. Feed a 1kHz/–5VU signal to the AUDIO INPUT.
2. Adjust AUDIO REC control for each channel output of –15 dBs at the ADAPTOR connector.
3. Record and play it back several times and adjust following controls for –0.5 dB peak over.

CH-1 : ● C410
CH-2 : ● C411
CH-3 : ● C412



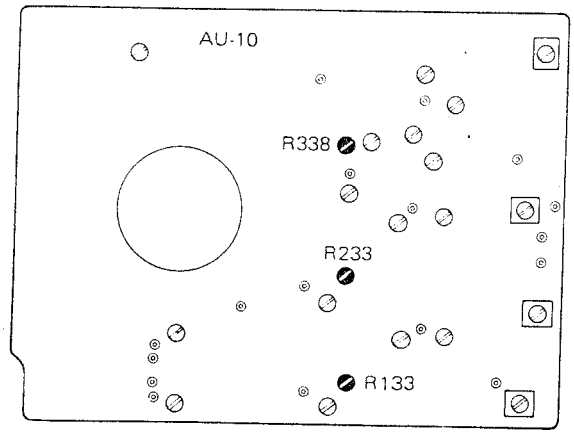


11-11. RECORD LEVEL ADJUSTMENT

VTR Mode : RECORD ⟷ PLAY
Equipment : Distortion Meter

1. Feed a 1kHz/+8 dBm signal to each AUDIO INPUT.
2. Set the machine in the RECORD mode and adjust for −10 dBs at the ADAPTOR connector by each AUDIO REC control.
3. Record and play it back several times and adjust for −10 dBs at the ADAPTOR connector by following controls.

CH-1 : R133
CH-2 : R233
CH-3 : R338



11-12. RECORD EQUALIZER ADJUSTMENT

VTR Mode : RECORD ⟷ PLAY
Equipment : Distortion Meter

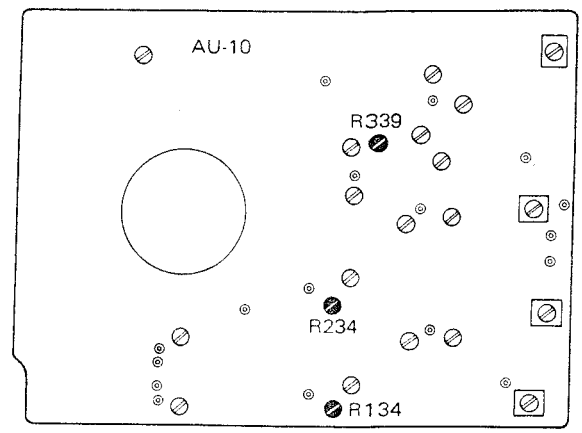
1. Record following frequencys with 10sec intervals.

   50, 100, 500, 2k, 7.5k, 15k : −10 VU

2. Play it back and confirm the frequency response.

   SPECIFICATIONS : -20^{+1}_{-3} dBs

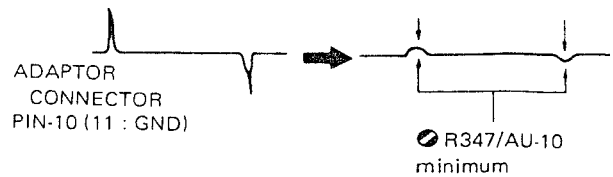
3. If it is out of specifications, adjusts R134 (CH-1), R234 (CH-2) and R339 (CH-3) respectively then repeat steps 1 and 2.



11-13. CTL CANCEL ADJUSTMENT

VTR Mode : RECORD ⟷ PLAY
Equipment : Oscilloscope

1. Connect scope to AUDIO CH-3 output at the ADAPTOR connector.
2. Record blank signal then play it back.
3. Adjust R347 on the AU-10 board for minimum interference from CTL pulse to AUDIO CH-3.

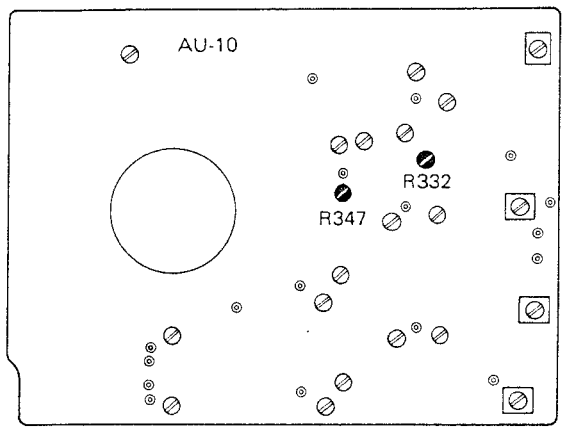


11-14. TIME CODE LEVEL ADJUSTMENT

VTR Mode : STANDBY
TIME CODE/LINE/MIC Select : TIME CODE position

1. Connect distortion meter to pin-10 (+) and pin-11 (–) of ADAPTOR connector.

2. ◐ R332 : TIME CODE LEVEL = 0 VU



11-15. VIDEO/SYNC MONITOR LEVEL ADJUSTMENT

VTR Mode : RECORD
Signal Source : COLOUR BAR

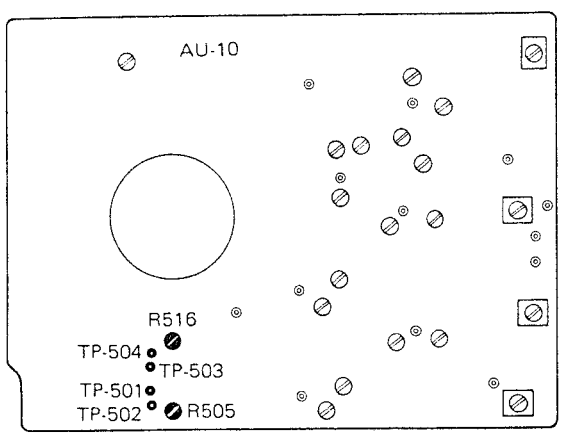
1. Short between TP-501 and TP-502 with jumper.

2. Adjust R505 until SERVO/RECORD alarm lamp lights.

3. Remove the jumper and connect the jumper between TP-503 and TP-504.

4. Adjust R516 until SERVO/RECORD alarm lamp lights.

5. Remove the jumpe between TP-503 and TP-504.



SECTION 12
POWER SUPPLY AND SERVO SYSTEM ALIGNMENT

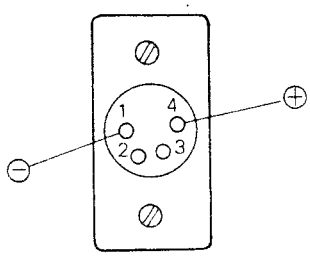
12-1. EQUIPMENT REQUIRED

1. DC Power Supply (10 ~ 13 V)
2. Digital Voltmeter
3. Frequency Counter
4. Tentelometer (Type T2-H12-2)
5. Oscilloscope

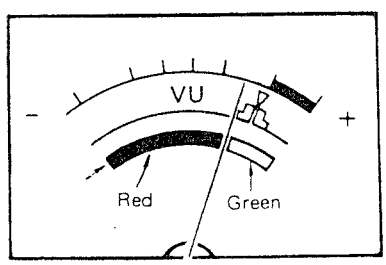
12-2. BATTERY ALARM LAMP (LIGHT-UP/BLINK) ADJUSTMENT

VTR MODE : RECORD
EQUIPMENT : DC power supply
Digital Voltmeter

1. Connect dc power supply to DC IN connector as shown below.



2. Connect digital voltmeter between TP-24 and TPE-3 on the SV board.
3. Set dc power supply output voltage to 10.79 Vdc.
4. ◐ R169/SV18: BATTERY ALARM LAMP = LIGHT
5. Set the METER/PHONE selector to BATTERY position. Adjust R15 on the DP-7 board to obtain the meter needle indication at the center between red and green zones.



6. Set dc power supply output voltage to 10.99 Vdc.
7. ◐ R119/SV-18: BATTERY ALARM LAMP = BLINK

12-3. 2 Vdc REFERENCE VOLTAGE ADJUSTMENT

VTR MODE : STANDBY
EQUIPMENT : Digital Voltmeter (DVM)

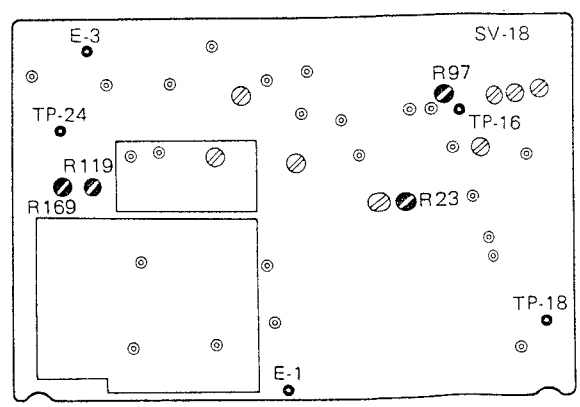
1. Connect DVM between TP-16 (+), and TPE-1 (−) on the SV-18 board.
2. ◐ R97/SV18: 2.00 ± 0.01 Vdc

12-4. DRUM DUTY ADJUSTMENT

VTR MODE : STANDBY
EQUIPMENT : Oscilloscope

1. Set SW1-1 on the SV-18 board to ON.
2. Connect scope between TP-18 and TPE-1 o the SV-18 board.
3. Set scope "HORIZ DISPLAY" to "A INTEN BY B" then superimpose a high light portion upon the trailing edge by using DELAY control as shown below.

4. Set scope "HORIZ DISPLAY" to "B".
5. Adjust R23 on the SV-18 board to obtain in phase at the leading edge and trailing edge when switch the polarity of "A TRIGGERING +/−".



12-5. DRUM POWER ADJUSTMENT

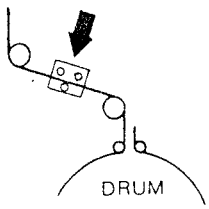
VTR MODE : STOP
EQUIPMENT : Digital Voltmeter (DVM)

● R166/SV-18: TP-29 (+), TPE-1 (–) } $17.0^{+0}_{-0.5}$ Vdc

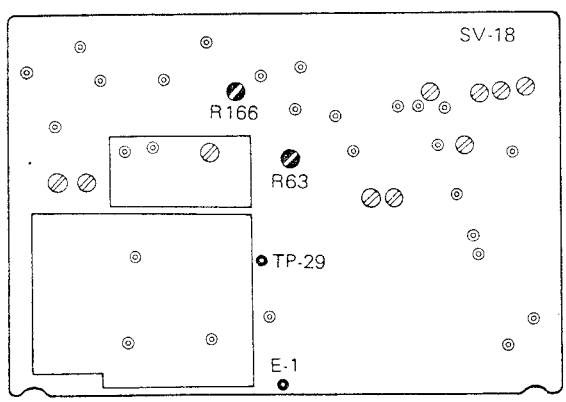
12-6. REEL TENSION VOLTAGE ADJUSTMENT

VTR MODE : RECORD
EQUIPMENT : TENTELOMETER(TYPE T2-H12-2)

1. Measure reel tension with the Tentelometer placed between the tape guide and guide roller as shown below.



2. Adjust R63 on the SV-18 board for a reel tension reading of 90 ± 5 grams.
   - Measure reel tension at the tape biginning, center and ending positions.



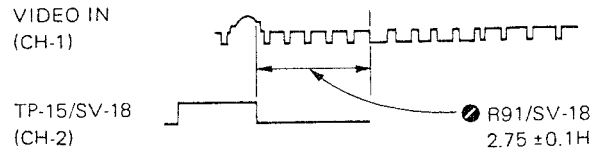
12-7. TAPE SPEED ADJUSTMENT

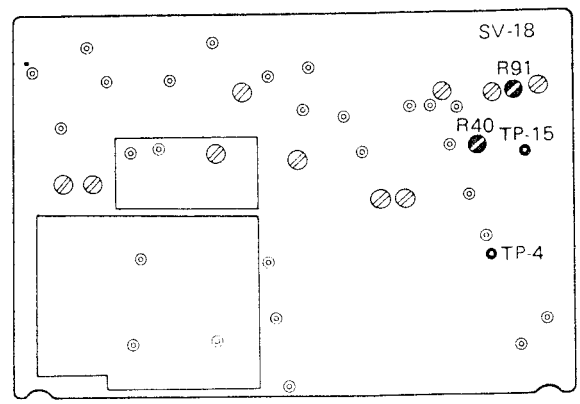
VTR MODE : RECORD ⟷ PLAY
EQUIPMENT : Frequency Counter

1. Connect frequency counter between TP-4 and GND on the SV-18 board.
2. ● R40/SV-18: 1127.5 ± 0.3 Hz
3. Play it back then confirm frequency.

12-8. DRUM PG LOCK ADJUSTMENT

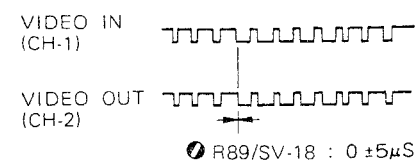
VTR MODE : RECORD
EQUIPMENT : Oscilloscope
SIGNAL SOURCE : COLOUR BAR
CAMERA/LINE select : LINE position

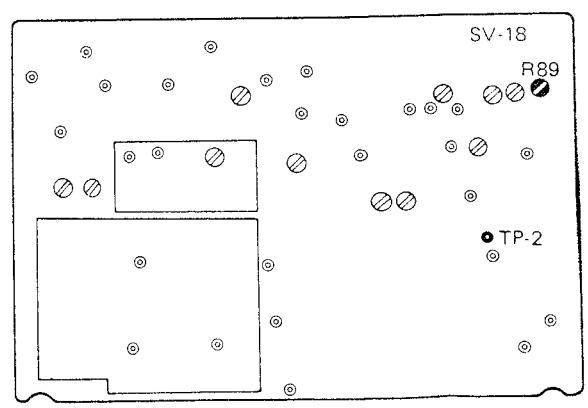




12-9. DRUM PG PHASE ADJUSTMENT

VTR MODE : PLAY (use Alignment Tape)
EQUIPMENT : Oscilloscope: TRIG, EXT from TP-2/SV-18
Alignment Tape: BR5-2PS-A4
SIGNAL SOURCE : COLOUR BAR
CAMERA/LINE select : LINE position

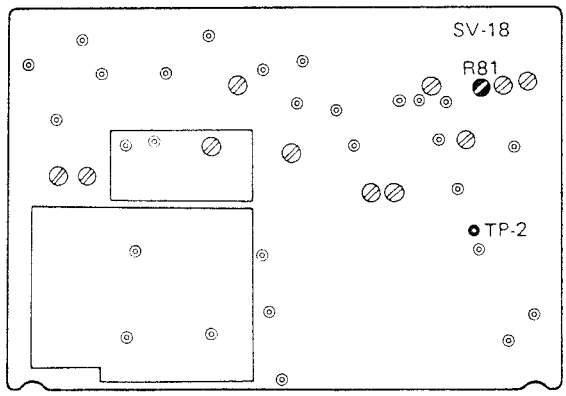




12-10. DRUM PG ADVANCE ADJUSTMENT

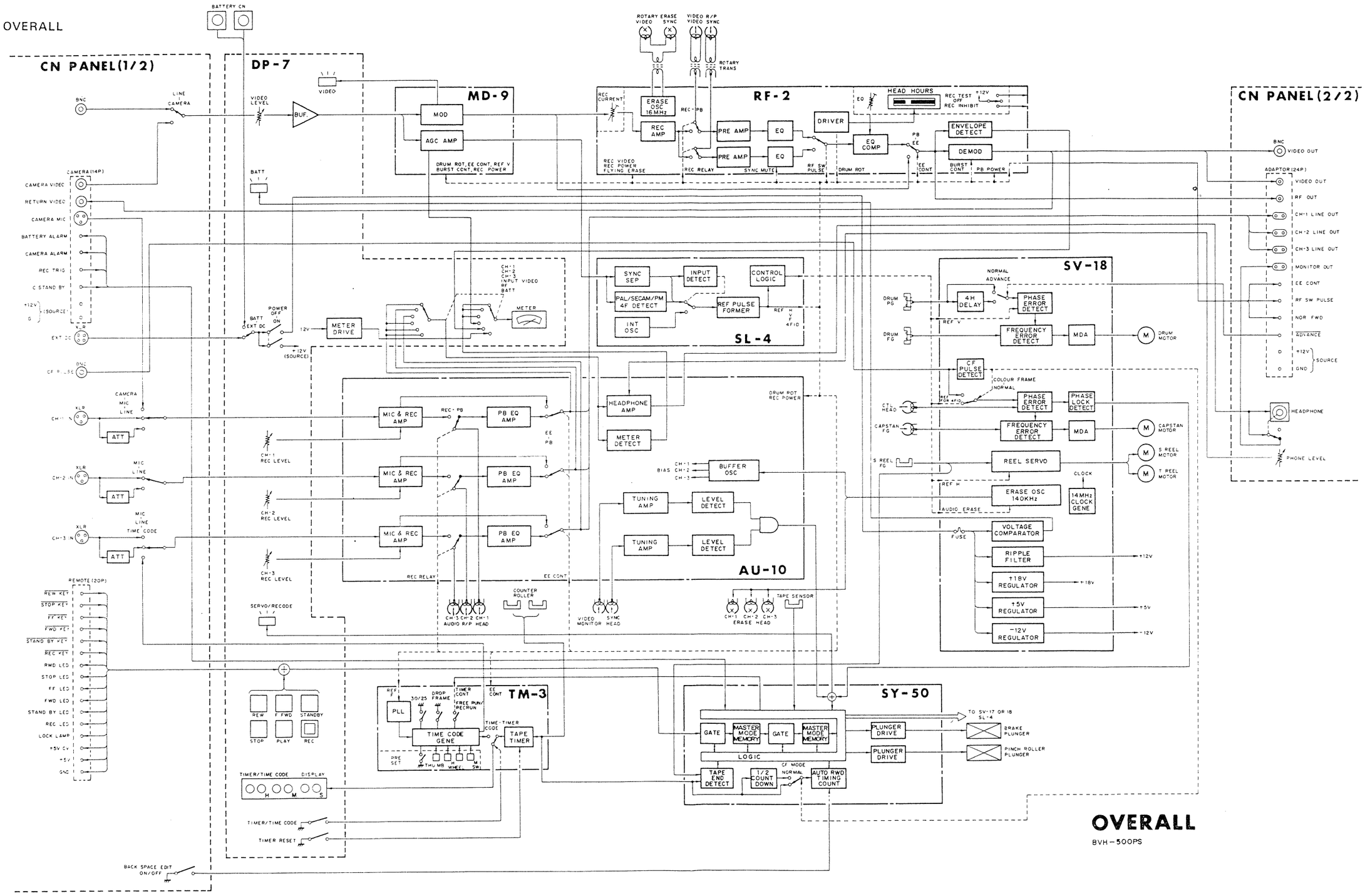
VTR MODE	:	PLAY (use Alignment Tape)
EQUIPMENT	:	Oscilloscope: TRIG, EXT from TP-2/SV-18
SIGNAL SOURCE	:	COLOUR BAR
CAMERA/LINE select	:	LINE position

1. Connect channel-1 of scope to VIDEO IN and channel-2 to VIDEO OUT.
2. Short between pin-14 of ADAPTOR connector (CN103) and ground.
3. Adjust video output phase to obtain 4H earlier than video in by R81 on the SV-18 board.



SECTION 13
BLOCK DIAGRAM

13-1. OVERALL

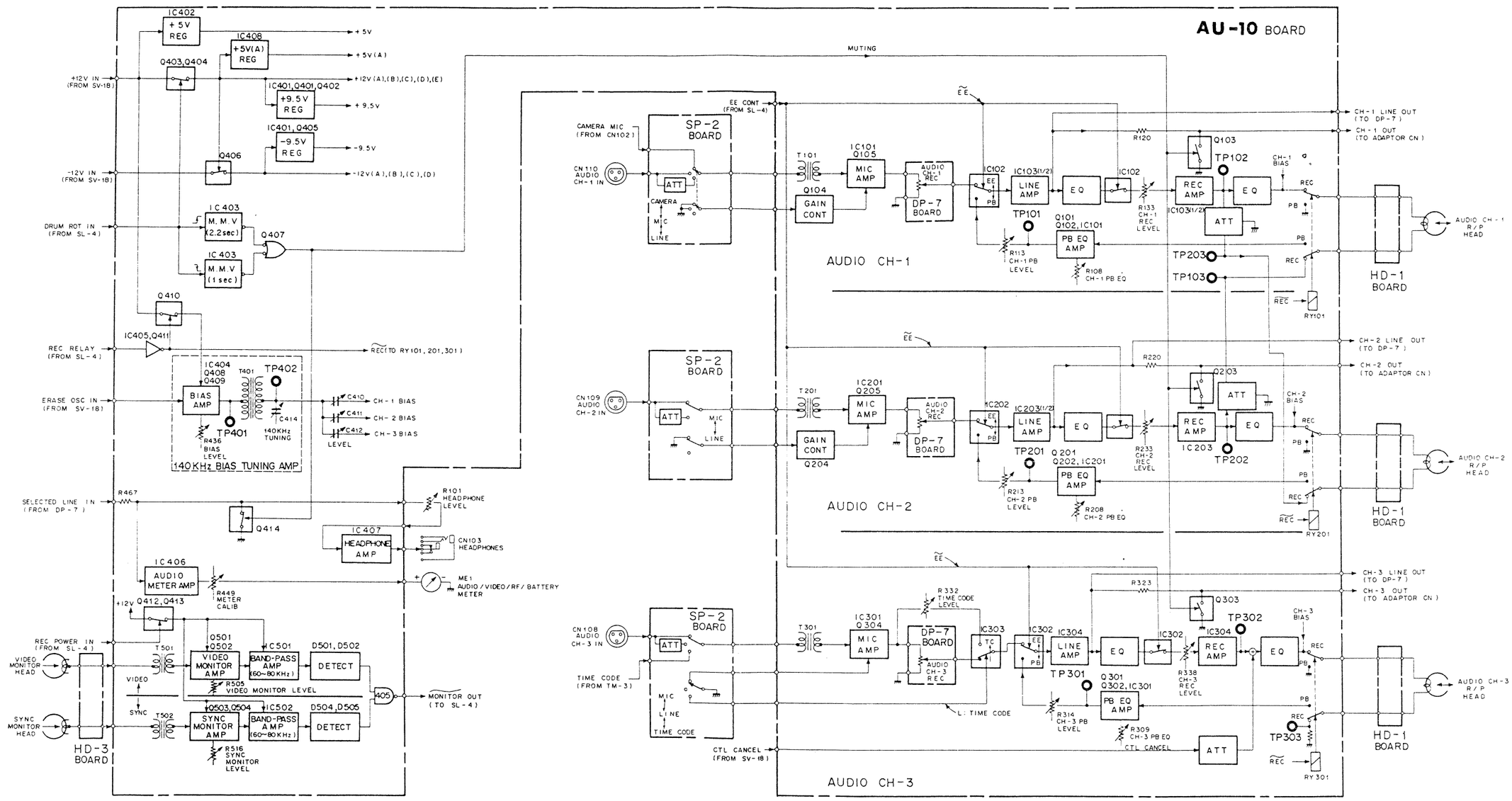


OVERALL

BVH-500PS

13-2. AU-10 BOARD

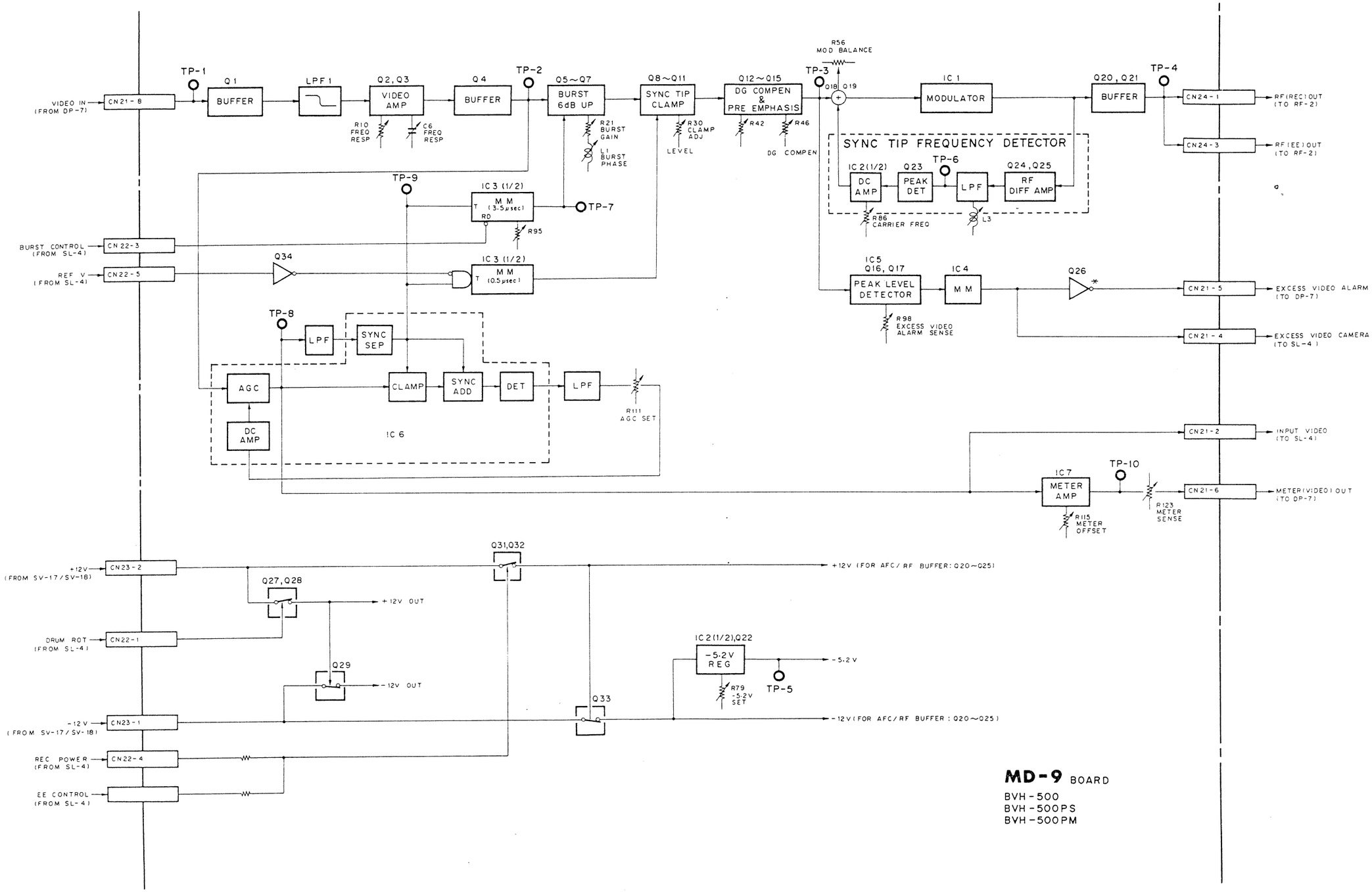
Audio REC/PB Amplifier
Audio Bias Tuning Amplifier
Video/Sync Monitor Amplifier



AU-10 BOARD
BVH-500PS

13-3. MD-9 BOARD

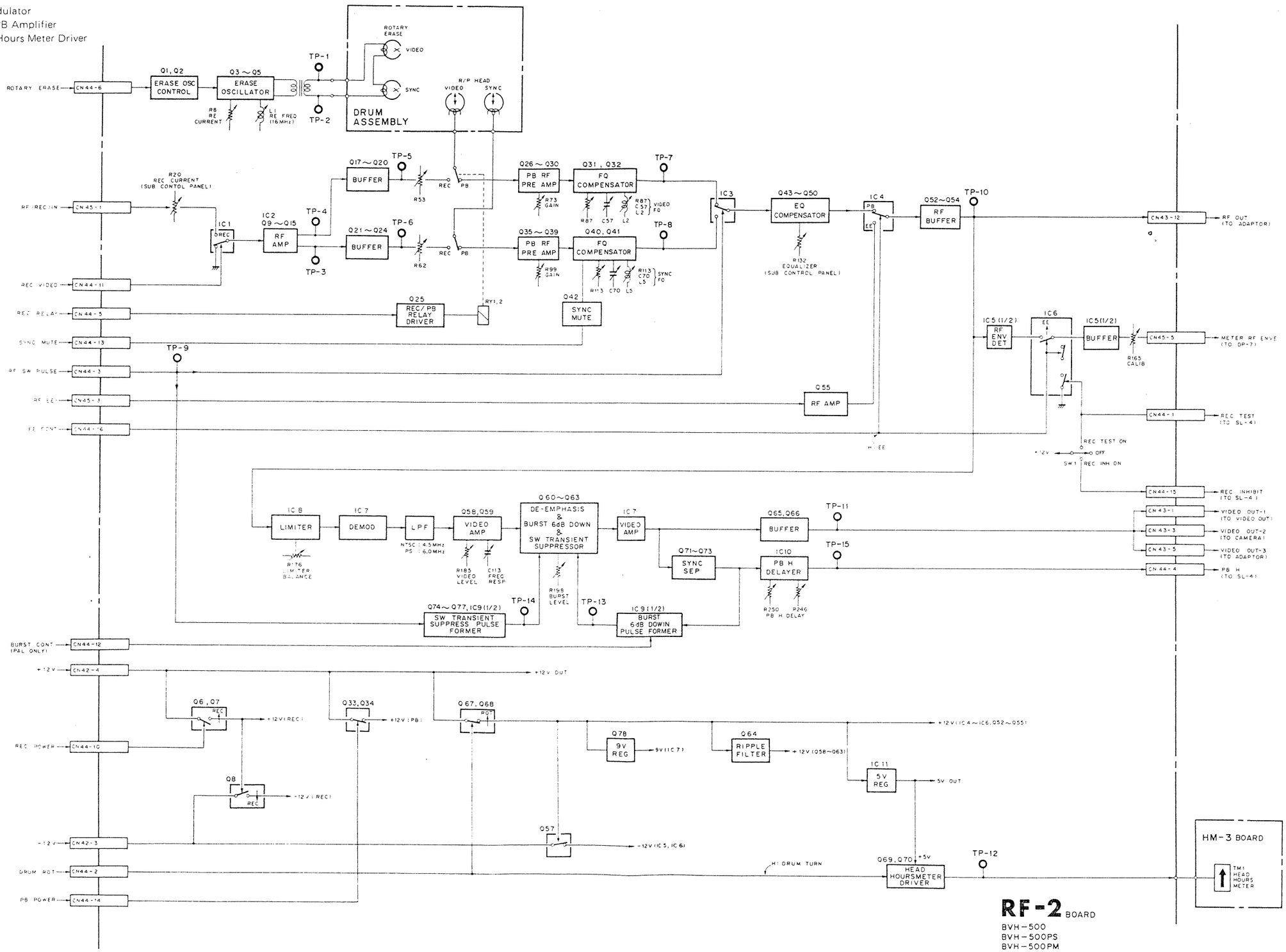
Modulator
Excess Video Alarm Detector
Video Level Meter Amplifier



MD-9 BOARD
BVH-500
BVH-500PS
BVH-500PM

13-4. RF-2 BOARD

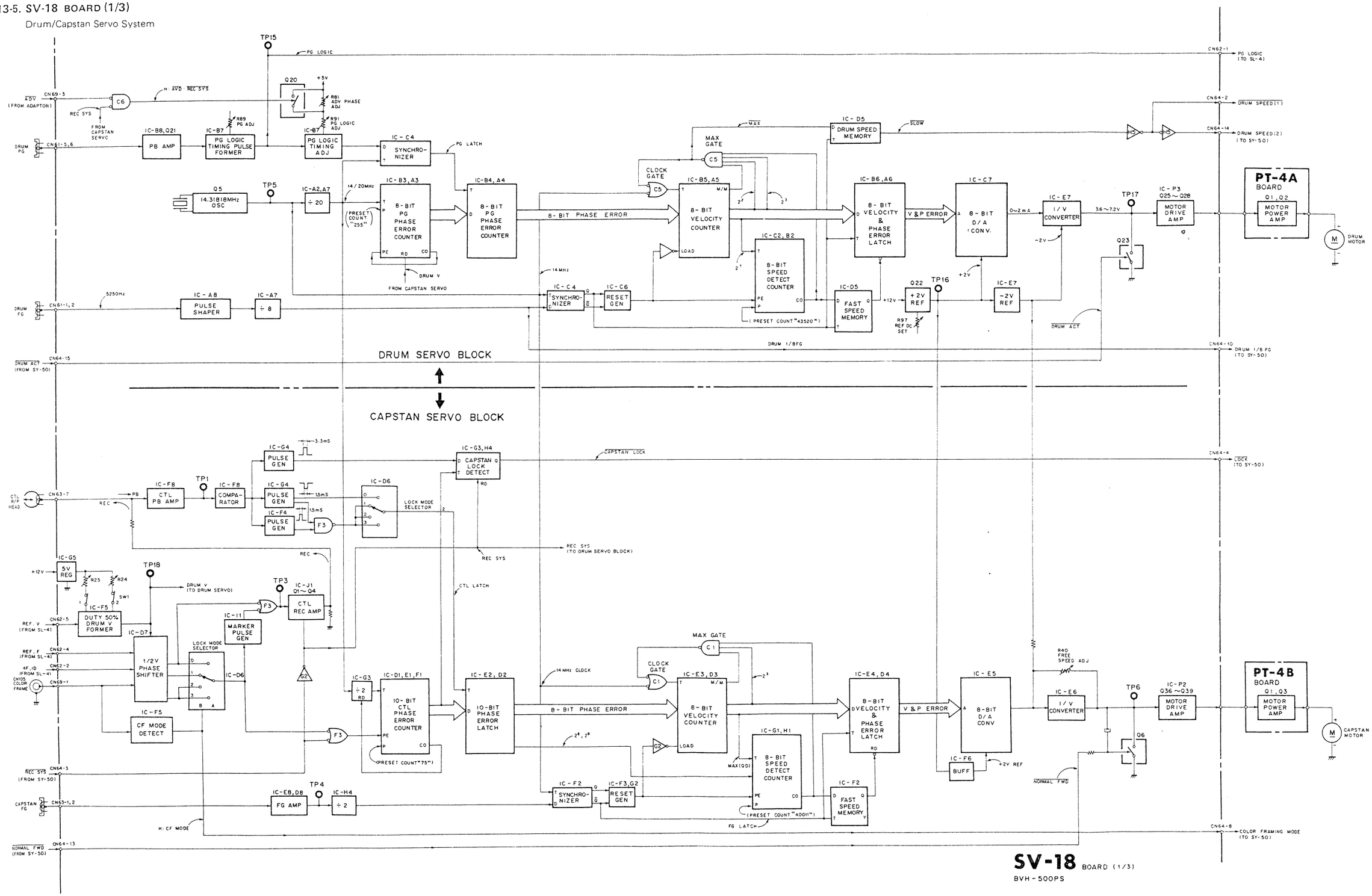
Demodulator
REC/PB Amplifier
Head Hours Meter Driver



RF-2 BOARD
BVH-500
BVH-500PS
BVH-500PM

13-5. SV-18 BOARD (1/3)

Drum/Capstan Servo System

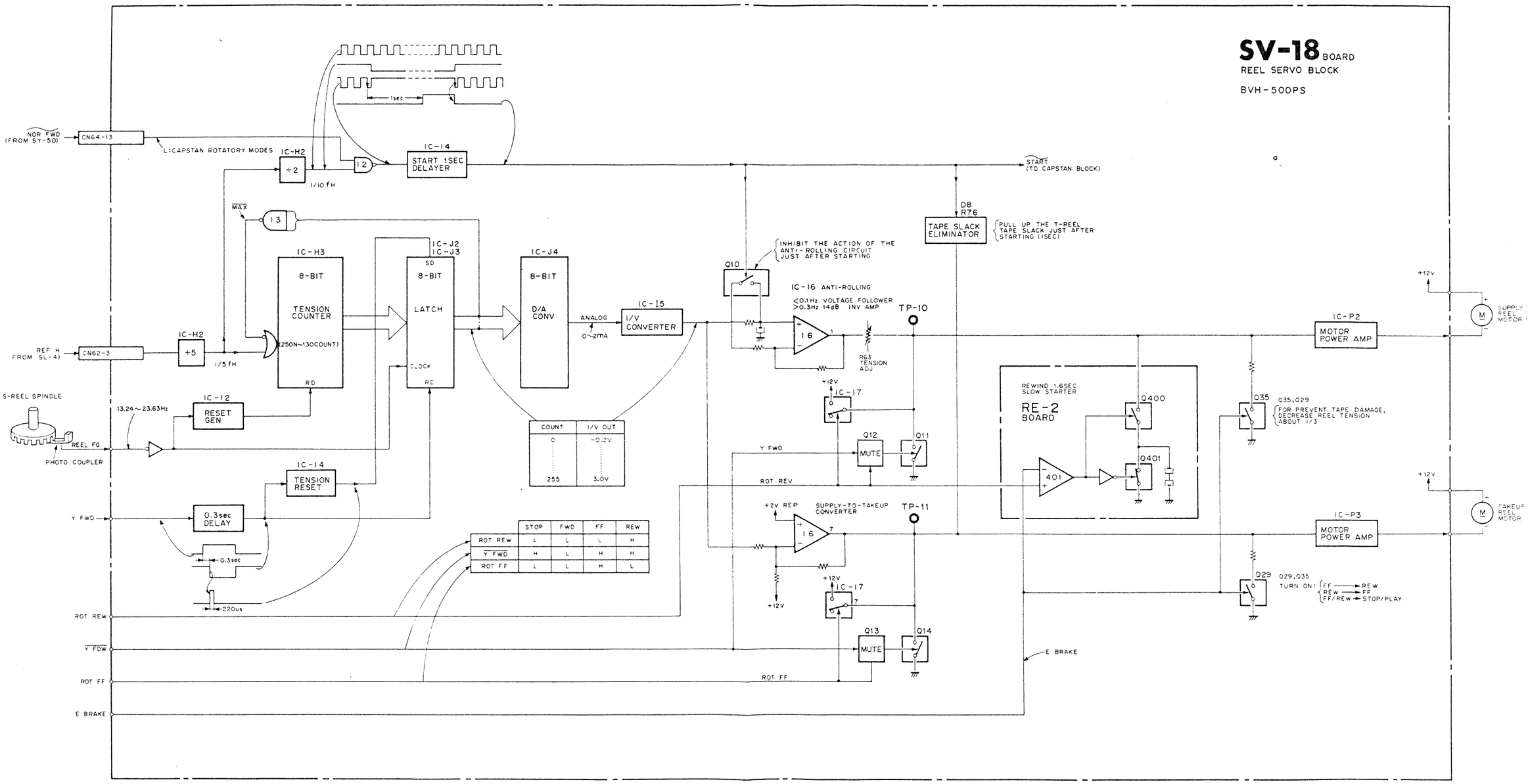


SV-18 BOARD (1/3)

BVH-500PS

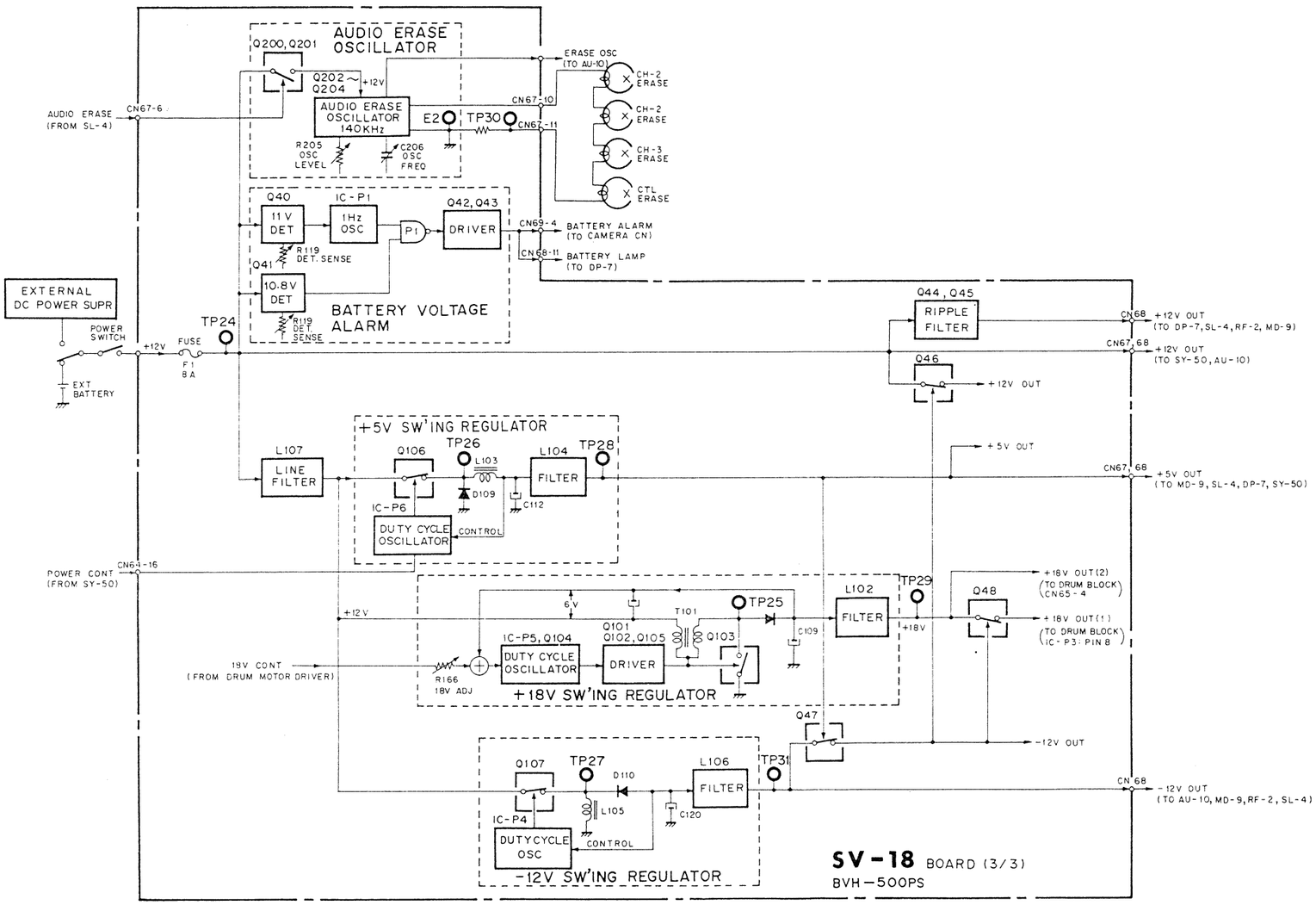
13-6. SV-18 BOARD (2/3)

Reel Servo System



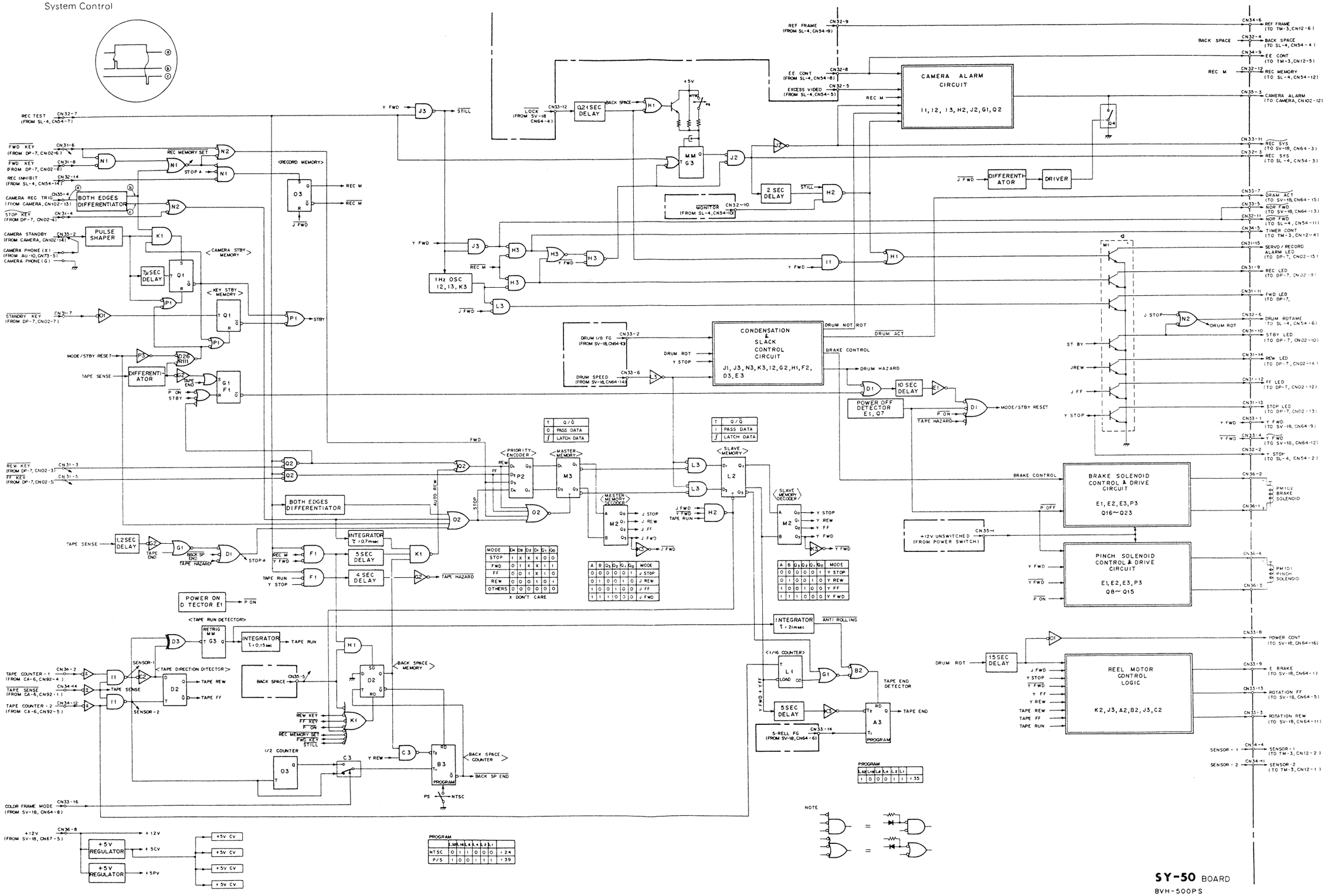
13-7. SV-18 BOARD (3/3)

Audio Bias/Erase Oscillator
Battery Voltage Alarm
Power Supply



13-8. SY-50 BOARD

System Control



13-15

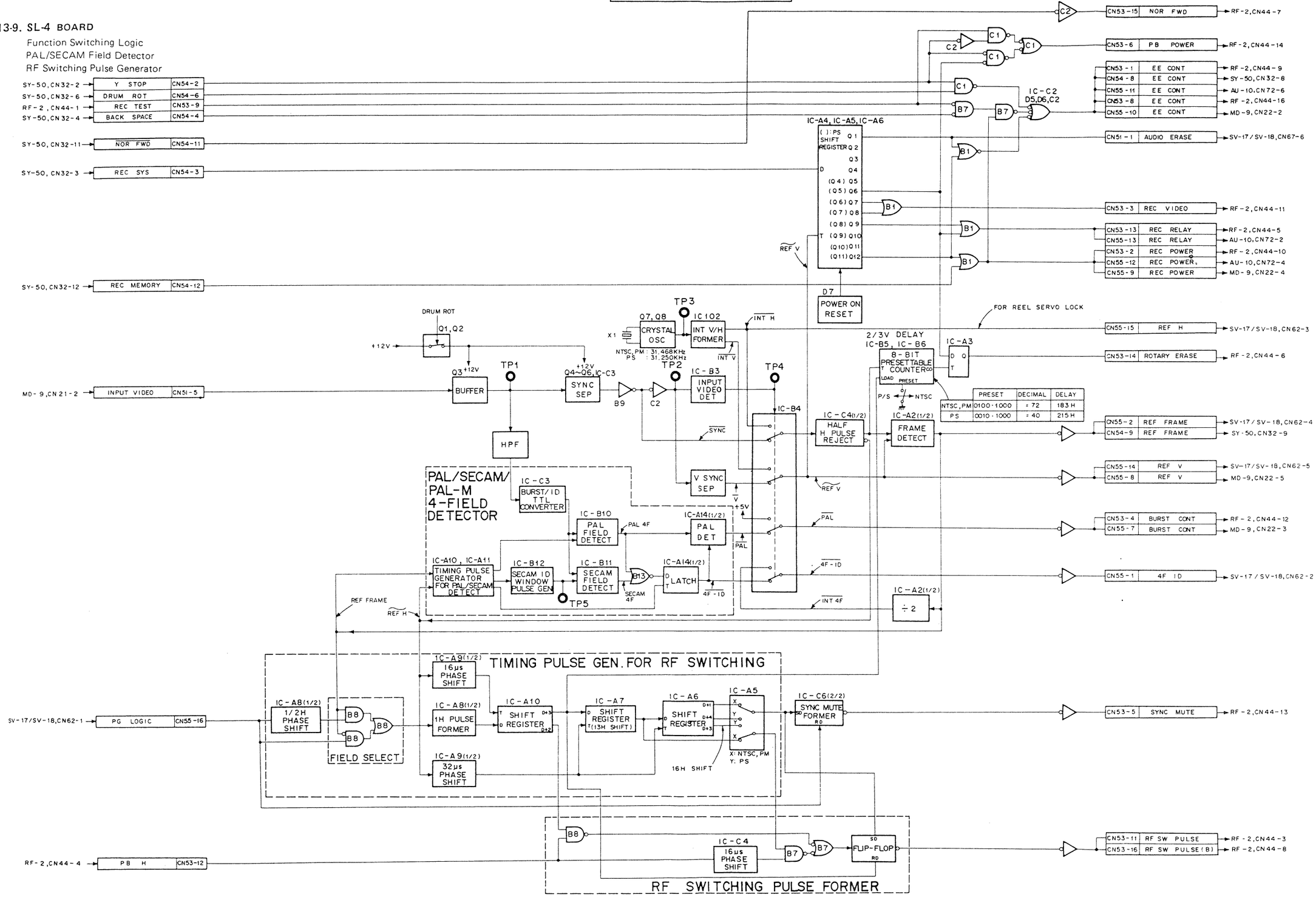
13-16

SY-50 BOARD

BVH-500PS

13-9. SL-4 BOARD

Function Switching Logic
PAL/SECAM Field Detector
RF Switching Pulse Generator

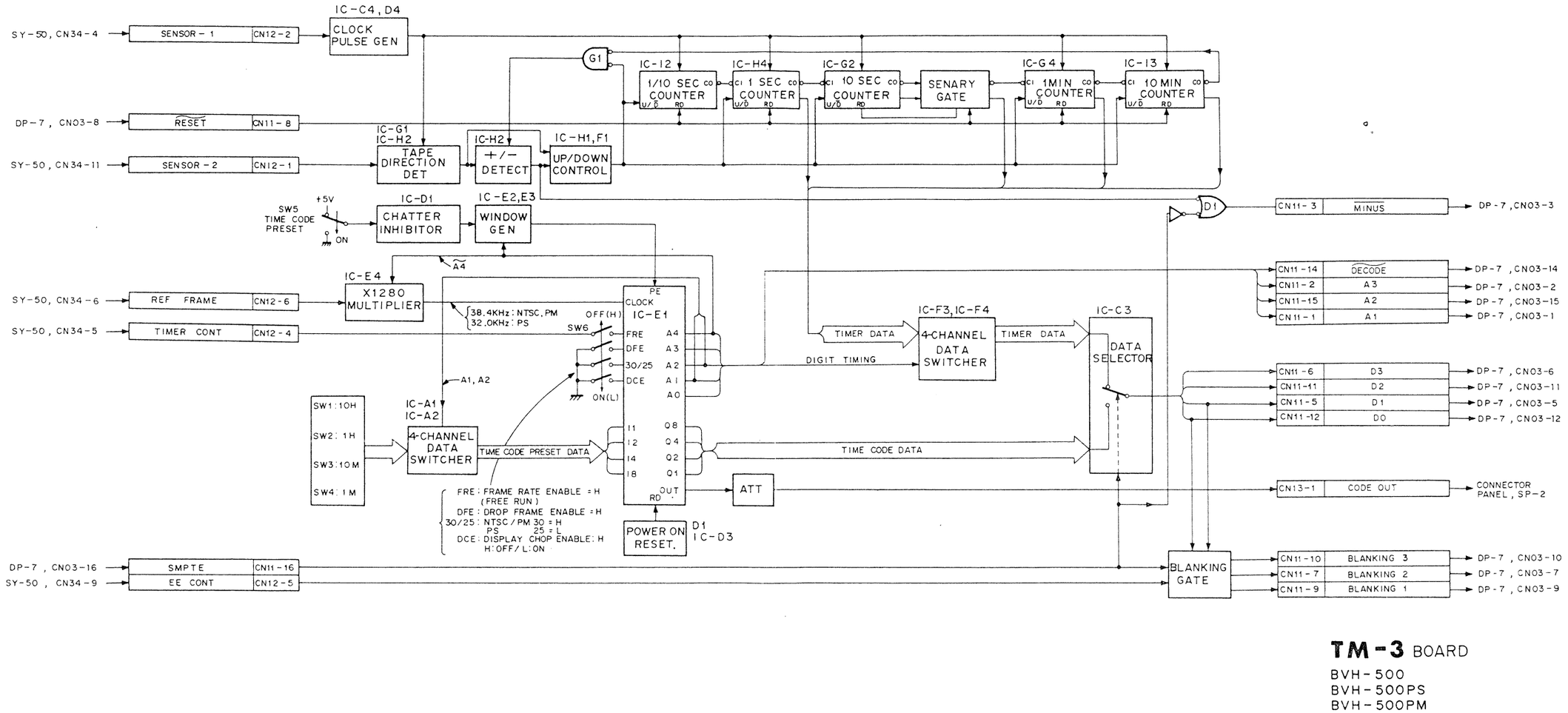


SL-4 BOARD

BVH-500
BVH-500PS
BVH-500PM

13-10. TM-3 BOARD

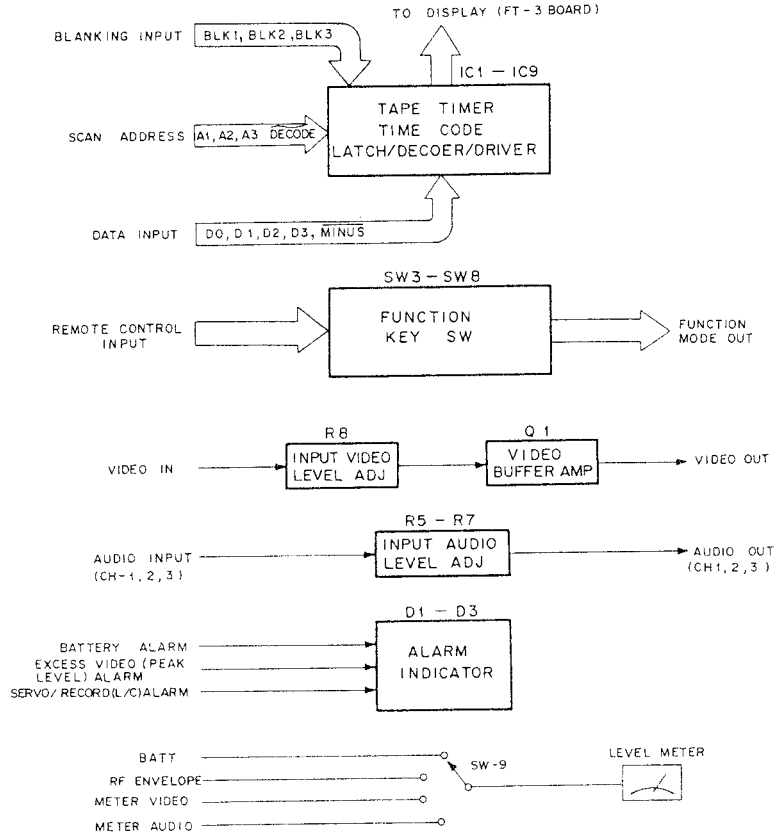
Tape Time Counter
Time Code Generator



TM-3 BOARD
BVH-500
BVH-500PS
BVH-500PM

13-11. DP-7 BOARD

Display Decoder



DP-7 BOARD

BVH-500
BVH-500PS
BVH-500PM

Bu

SONY®

Complete Spare Parts List

PORTABLE VIDEOCORDER

Model BVH-500P S

AEP MODEL

IMPORTANT

When ordering parts, be sure to furnish the following information:

1. Part Number
2. Model Number
3. Description as contained in this parts list

Due to our use of an electronic data processing system, your orders are processed by the PART NUMBER specified by you.

Please order carefully-wrong part numbers result in wrong parts.

NOTE: Prices are subject to change without notice.

Jan. 1979

CAUTION

1. **Safety Related Component Warning**

   Components identified by shading and ⚠-mark on this list are critical to safe operation. Replace these components with Sony parts whose parts numbers appear as shown in this list or in service bulletins and service manual supplements published by Sony.

2. Replace Parts that are supplied from Sony Parts Center can sometimes have different shape and external appearance than what are actually used in equipment. This is due to "**accommodating the improved parts and/or engineering changes**" or "**standardization of genuine parts**".

   - This list is indicating the parts numbers of "the standardized genuine parts at present".
   - Regarding engineering parts changes in our engineering department, refer Sony service bulletins and service manual supplements.

3. **Printed Components in Bold-Face type** on this list are normally stocked for replacement purposes. The remaining parts are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Parts No.	Description	Unit Price
A-6003-017-A	Leg Ass'y	$ 23.49
A-6005-007-A	**Button Ass'y, S**	**1.29**
A-6005-008-A	**Button Ass'y, P**	**1.29**
A-6005-009-A	**Button Ass'y, R**	**1.29**
A-6005-010-A	**Button Ass'y, F.R**	**1.29**
A-6005-011-A	**Button Ass'y, S.T**	**1.29**
A-6011-035-A	Mounted Board, RF-2 (NTSC)	280.00
A-6011-036-A	Mounted Board, RF-2 (PAL/SECAM)	273.33
A-6011-037-A	Mounted Board, MD-9 (NTSC)	110.00
A-6011-038-A	Mounted Board, MD-9 (PAL/SECAM)	106.67
A-6013-018-A	Mounted Board, AU-10	290.00
⚠ A-6015-025-A	Mounted Board, SV-17 (NTSC)	446.67
⚠ A-6015-026-A	Mounted Board, SV-18 (PAL/SECAM)	420.00
⚠ A-6017-021-A	Mounted Board, SY-50	216.67
A-6017-023-A	Mounted Board, SL-4 (NTSC)	163.33
A-6017-024-A	Mounted Board, SL-4 (PAL/SECAM)	143.33
A-6017-025-A	Mounted Board, DP-7	140.00
A-6017-026-A	Mounted Board, TM-3	460.00
A-6035-020-A	**Capstan Ass'y**	**66.67**
A-6036-013-A	**Head Ass'y, erase (NTSC)**	**56.67**
A-6036-014-A	**Head Ass'y, erase (PAL/SECAM)**	**103.33**
A-6039-008-A	**Table Ass'y, S reel**	**150.00**
A-6039-009-A	**Table Ass'y, T reel**	**76.67**
A-6046-015-A	**Guide Ass'y, slant**	**133.33**
A-6050-025-A	**Head Drum Ass'y, RD102RP (NTSC)**	**744.00**
A-6050-027-A	**Head Drum Ass'y, RD101RP (PAL/SECAM)**	**763.33**
A-6052-014-A	**Upper Drum Ass'y, RV-102RP (NTSC)**	**270.00**
A-6052-016-A	**Upper Drum Ass'y, RV-101RP (PAL/SECAM)**	**290.00**
X-3651-203-0	Screw Ass'y, shaft ground	2.81
X-3651-308-0	**Band Ass'y, brake**	**4.00**
X-3654-904-0	**Bracket Ass'y, ground**	**1.93**
X-3656-901-0	Shaft Ass'y, capstan	28.59
X-3656-902-0	Lever Ass'y, solenoid	4.39
X-3656-903-0	Arm Ass'y, CR	1.77
X-3656-904-0	Claw Ass'y, reel	0.32
X-3656-905-0	Handle (S) Ass'y	5.56
X-3656-906-0	Pipe Ass'y, lock	5.56
X-3656-907-0	Handle (T) Ass.Y	5.56
X-3656-910-0	Lever (B) Ass'y, brake	0.81
X-3656-911-0	Lever (C) Ass'y, brake	0.57

Parts No.	Description	Unit Price
X-3656-912-0	Bracket (R) Ass'y, DP	$ 0.73
X-3656-913-0	Bracket (L) Ass'y, DP	0.73
X-3656-914-0	Plate Ass'y, shield, timer	1.61
X-3656-916-0	Flywheel Ass'y	33.39
X-3656-917-0	Bracket Ass'y, PC board	9.38
X-3656-918-0	Plate Ass'y, shield, DEM	9.38
X-3656-922-0	Holder Ass'y,	16.68
X-3656-923-0	Shaft Ass'y, reel	23.49
X-3656-924-0	**Lid Ass'y, sub control**	**1.93**
X-3656-925-0	**Lid Ass'y, drum**	**4.39**
X-3656-926-0	Roller Ass'y	0.57
X-3656-927-0	Spring Ass'y, lock	0.41
X-3656-928-0	Arm Ass'y, tension	1.13

1-101-005-00	C, ceramic	0.022μF		50V	0.02
1-102-074-00	C, ceramic	0.001μF		50V	0.04
1-102-106-00	C, ceramic	100pF		50V	0.02
1-102-108-00	C, ceramic	150pF		50V	0.02
1-102-110-00	C, ceramic	220pF		50V	0.02
1-102-111-00	C, ceramic	270pF		50V	0.02
1-102-112-00	C, ceramic	330pF		50V	0.02
1-102-114-00	C, ceramic	470pF		50V	0.02
1-107-061-00	C, mica	10pF	5%	50V	0.08
1-107-065-00	C, mica	15pF	5%	50V	0.08
1-107-067-00	C, mica	18pF	5%	50V	0.08
1-107-068-00	C, mica	20pF	5%	50V	0.08
1-107-073-00	C, mica	33pF	5%	50V	0.08
1-107-076-00	C, mica	43pF	5%	50V	0.08
1-107-078-00	C, mica	51pF	5%	50V	0.08
1-107-079-00	C, mica	56pF	5%	50V	0.08
1-107-080-00	C, mica	62pF	5%	50V	0.08
1-107-081-00	C, mica	68pF	5%	50V	0.08
1-107-082-00	C, mica	75pF	5%	50V	0.08
1-107-083-00	C, mica	82pF	5%	50V	0.08
1-107-084-00	C, mica	91pF	5%	50V	0.08
1-107-085-00	C, mica	100pF	5%	50V	0.08
1-107-087-00	C, mica	120pF	5%	50V	0.08

	Unit Price
no mark	$ 0.04
* mark	$ 0.08
** mark	$ 0.12

1-108-□□□-00 C. mylar 10% 50 V

Parts No. —□□□—	Value
227	0.001 μF
228	0.0015
230	0.0022
232	0.0033
234	0.0047
237	0.0068
239	0.01

Parts No. —□□□—	Value
240	0.015 μF
242	0.022
* 244	0.033
* 246	0.047
* 249	0.068
* 251	0.1
** 252	0.15

Parts No. —□□□—	Value
** 254	0.22 μF
351	0.0012
352	0.0018
353	0.0027
354	0.0039
355	0.0056
356	0.0082

Parts No. —□□□—	Value
357	0.012 μF
358	0.018
* 359	0.027
* 360	0.039
* 361	0.056
* 362	0.082
** 363	0.12
** 364	0.18

Parts No.	Description					Unit Price
1-109-525-00	C, mica	39pF	5%	100V	----------	$ 0.36
1-109-527-00	C, mica	47pF	5%	100V	----------	0.36
1-109-535-00	C, mica	100pF	5%	100V	----------	0.36
1-109-538-00	C, mica	130pF	5%	100V	----------	0.41
1-109-540-00	C, mica	180pF	5%	100V	----------	0.41
1-109-545-00	C, mica	270pF	5%	100V	----------	0.49
1-109-547-00	C, mica	330pF	5%	100V	----------	0.57
1-109-549-00	C, mica	390pF	5%	100V	----------	0.57
1-109-551-00	C, mica	440pF	5%	100V	----------	0.65
1-109-557-00	C, mica	680pF	5%	100V	----------	0.73
1-109-561-00	C, mica	0.001μF	5%	100V	----------	0.97
1-109-676-00	C, mica	130pF	5%	500V	----------	0.49
1-109-677-00	C, mica	150pF	5%	500V	----------	0.49
1-109-695-00	C, mica	820pF	2%	500V	----------	0.81
1-109-701-00	C, mica	0.0015μF	2%	500V	----------	1.93
1-109-739-00	C, mica	100pF	1%	100V	----------	0.81
1-109-740-00	C, mica	3900pF	2%	500V	----------	2.81
1-123-306-00	C, elect	47μF		10V	----------	0.08
1-123-307-00	C, elect	100μF		10V	----------	0.08
1-123-309-00	C, elect	330μF		10V	----------	0.12
1-123-311-00	C, elect	1000μF		10V	----------	0.16
1-123-318-00	C, elect	33μF		16V	----------	0.08
1-123-322-00	C, elect	330μF		16V	----------	0.12
1-123-323-00	C, elect	470μF		16V	----------	0.16
1-123-325-00	C, elect	2200μF		16V	----------	0.32

Parts No.	Description					Unit Price
1-123-332-00	C, elect	47μF		25V		$ 0.08
1-123-333-00	C, elect	100μF		25V		0.08
1-123-334-00	C, elect	220μF		25V		0.12
1-123-336-00	C, elect	470μF		25V		0.20
1-123-356-00	C, elect	10μF		50V		0.08
1-131-182-00	C, tantalum	10μF	10%	3.15V		0.16
1-131-184-00	C, tantalum	33μF	10%	3.15V		0.24
1-131-186-00	C, tantalum	68μF	10%	3.15V		0.20
1-131-187-00	C, tantalum	100μF	10%	3.15V		0.24
1-131-189-00	C, tantalum	15μF	10%	6.3V		0.20
1-131-191-00	C, tantalum	47μF	10%	6.3V		0.28
1-131-194-00	C, tantalum	15μF	10%	10V		0.24
1-131-195-00	C, tantalum	33μF	10%	10V		0.24
1-131-198-00	C, tantalum	6.8μF	10%	16V		0.20
1-131-199-00	C, tantalum	10μF	10%	16V		0.20
1-131-200-00	C, tantalum	15μF	10%	16V		0.24
1-131-201-00	C, tantalum	22μF	10%	16V		0.28
1-131-209-00	C, tantalum	0.1μF	10%	35V		0.16
1-131-210-00	C, tantalum	0.15μF	10%	35V		0.16
1-131-211-00	C, tantalum	0.22μF	10%	35V		0.16
1-131-212-00	C, tantalum	0.33μF	10%	35V		0.16
1-131-213-00	C, tantalum	0.47μF	10%	35V		0.16
1-131-214-00	C, tantalum	0.68μF	10%	35V		0.16
1-131-215-00	C, tantalum	1μF	10%	35V		0.16
1-131-216-00	C, tantalum	1.5μF	10%	35V		0.20
1-131-217-00	C, tantalum	2.2μF	10%	35V		0.20
1-131-218-00	C, tantalum	3.3μF	10%	35V		0.24
1-131-219-00	C, tantalum	4.7μF	10%	35V		0.24
1-131-227-00	C, tantalum	15μF	10%	3.15V		0.20
1-131-232-00	C, tantalum	4.7μF	10%	16V		0.24
1-131-235-00	C, tantalum	15μF	10%	20V		0.24
1-131-236-00	C, tantalum	1μF	10%	25V		0.16
1-131-237-00	C, tantalum	1.5μF	10%	25V		0.16
1-131-238-00	C, tantalum	10μF	10%	25V		0.20
1-131-239-00	C, tantalum	6.8μF	10%	35V		0.24
1-131-240-00	C, tantalum	47μF	20%	16V		0.73
1-131-427-00	C, tantalum	220μF	20%	6.3V		1.29
1-131-480-00	C, tantalum	68μF	20%	20V		0.97
1-131-481-00	C, tantalum	47μF	20%	20V		0.97
1-141-010-XX	C, trimmer	120pF				0.28
1-141-131-00	C, trimmer	50pF				0.28
1-141-155-00	C, trimmer	600pF				0.57
1-161-001-00	C, ceramic	0.001μF		25V		0.04
1-161-019-00	C, ceramic	0.033μF		25V		0.04
1-161-025-00	C, ceramic	0.1μF		25V		0.08
⚠1-207-615-00	R, metal	0.33	10%	2W		0.12
⚠1-212-364-00	R, metal	2.2	5%	1W		0.04

		Unit Price
	no mark	$ 0.04
1-214-□□□-00 R, metal 1% 1/4W	* mark	$ 0.08

Parts No. −□□□−	Value
084	10Ω
085	11
086	12
087	13
088	15
089	16
090	18
091	20
092	22
093	24
094	27
095	30
096	33
097	36
098	39
099	43
100	47
101	51
102	56
103	62
104	68
105	75
106	82
107	91

Parts No. −□□□−	Value
108	100Ω
109	110
110	120
111	130
112	150
* 113	160
114	180
115	200
116	220
117	240
118	270
119	300
120	330
121	360
122	390
123	430
124	470
125	510
126	560
127	620
128	680
129	750
130	820
131	910

Parts No. −□□□−	Value
132	1.0kΩ
133	1.1
134	1.2
135	1.3
136	1.5
137	1.6
138	1.8
139	2.0
140	2.2
141	2.4
142	2.7
143	3.0
144	3.3
145	3.6
146	3.9
147	4.3
148	4.7
149	5.1
150	5.6
151	6.2
152	6.8
153	7.5
154	8.2
155	9.1

Parts No. −□□□−	Value
156	10kΩ
157	11
158	12
159	13
160	15
161	16
162	18
163	20
164	22
165	24
166	27
167	30
168	33
169	36
170	39
171	43
172	47
173	51
174	56
175	62
176	68
177	75
178	82
179	91
180	100

Parts No.	Description				Unit Price
⚠1-217-153-00	R, wirewound	0.47	10%	2W	$ 0.08
⚠1-217-154-00	R, metal	0.68	10%	2W	0.08
⚠1-217-579-00	R, metal	0.27	10%	2W	0.08
1-224-692-XX	R, VAR carbon	10K(A)			0.49
1-224-923-00	R, VAR metal	100K			1.45
1-224-924-00	R, VAR metal	100			1.29
1-224-928-00	R, VAR metal	2K			1.29
1-224-934-00	R, VAR metal	100			1.45

Parts No.	Description				Unit Price
1-224-935-00	R, VAR metal	200			$ 1.45
1-224-936-00	R, VAR metal	500			1.45
1-224-937-00	R, VAR metal	1K			1.45
1-224-938-00	R, VAR metal	2K			1.45
1-224-939-00	R, VAR metal	5K			1.45
1-224-940-00	R, VAR metal	10K			1.45
1-224-941-00	R, VAR metal	20K			1.45
1-224-942-00	R, VAR metal	50K			1.45
1-224-943-00	R, VAR metal	100K			1.45
1-226-403-00	R, VAR carbon	1K (B)			0.41
1-226-404-00	R, VAR carbon,	10K (A)			0.41
1-231-411-00	R, resistor block	100K			0.28
1-231-413-00	Filter, LPF	4.5MHz			26.08
1-231-414-00	Filter, LPF	6.0MHz			26.08
1-231-415-00	Filter, LPF				4.00
1-246-401-00	R, carbon	1	5%	¼W	0.02
1-246-429-00	R, carbon	15	5%	¼W	0.02
1-246-521-00	R, carbon	100K	5%	¼W	0.02
1-246-524-00	R, carbon	130K	5%	¼W	0.02
1-246-525-00	R, carbon	150K	5%	¼W	0.02
1-246-527-00	R, carbon	180K	5%	¼W	0.02
1-246-528-00	R, carbon	200K	5%	¼W	0.02
1-246-529-00	R, carbon	220K	5%	¼W	0.02
1-246-530-00	R, carbon	240K	5%	¼W	0.02
1-246-532-00	R, carbon	300K	5%	¼W	0.02
1-246-537-00	R, carbon	470K	5%	¼W	0.02
1-246-538-00	R, carbon	510K	5%	¼W	0.02
1-246-540-00	R, carbon	620K	5%	¼W	0.02
1-246-543-00	R, carbon	820K	5%	¼W	0.02
1-246-545-00	R, carbon	1M	5%	¼W	0.02
1-407-159-XX	Inductor, micro	15μH			0.08
1-407-161-XX	Inductor, micro	22μH			0.08
1-407-165-XX	Inductor, micro	47μH			0.08
1-407-168-XX	Inductor, micro	82μH			0.08
1-407-177-XX	Inductor, micro	470μH			0.08
1-407-191-XX	Inductor, micro	470μH			0.12
1-407-195-XX	Inductor, micro	1mH			0.12
1-407-196-XX	Inductor, micro	1.2mH			0.12
1-407-198-XX	Inductor, micro	2.2mH			0.12
1-407-200-XX	Inductor, micro	3.3mH			0.12
1-407-206-XX	Inductor, micro	10mH			0.12
1-407-211-XX	Inductor, micro	27μH			0.16
1-407-213-XX	Inductor, micro	1.5mH			0.12
1-407-564-00	Inductor, VAR	1.5μH			0.32
1-407-565-00	Inductor, VAR	2.2μH			0.32
1-407-569-00	Inductor, VAR	10μH			0.32
1-409-309-00	Inductor, transformer troidal				0.57
1-413-034-00	Inductor, transformer troidal				5.56
1-413-035-00	Inductor, transformer troidal	100μH			3.20

Parts No.	Description	Unit Price
1-413-036-00	**Inductor, transformer troidal 500μH**	$ **3.20**
1-415-105-00	**Delay Line, 32nS**	**6.33**
1-417-069-00	**Transformer**	**1.13**
1-425-942-00	**Transformer, RF**	**7.87**
1-427-456-00	**Transformer**	**22.16**
1-433-194-00	**Transformer**	**5.56**
1-433-205-00	**Transformer**	**3.20**
1-454-199-00	**Solenoid**	**10.88**
1-454-200-00	**Solenoid**	**9.38**
1-507-261-XX	**Jack, dc**	**0.32**
1-507-477-XX	**Phone Jack, JM60-M19**	**0.73**
1-508-900-00	Receptacle, 2P, male	0.08
1-508-901-00	Receptacle, 3P, male	0.12
1-508-902-00	Receptacle, 4P, male	0.08
1-508-903-00	Receptacle, 5P, male	0.08
1-508-904-00	Receptacle, 6P, male	0.12
1-508-905-00	Receptacle, 8P, male	0.12
1-508-906-00	Receptacle, 10P, male	0.16
1-508-933-00	Receptacle, 2P, male	0.08
1-508-934-00	Receptacle, 3P, male	0.08
1-508-935-00	Receptacle, 5P, male	0.12
1-508-936-00	Receptacle, 6P, male	0.12
1-508-937-00	Receptacle, 8P, male	0.16
1-508-949-00	Receptacle, 12P, male	0.16
1-508-950-00	Receptacle, 4P, male	0.08
1-508-951-00	Receptacle, 10P, male	0.16
1-508-997-00	Receptacle, 12P, male	0.20
1-509-176-00	**Receptacle, XLR3P, male**	**3.20**
1-509-177-00	**Receptacle, 4P, male**	**4.00**
1-509-184-00	**Receptacle, XLR3P, female**	**5.56**
1-509-639-00	**Receptacle, 20P, female**	**1.45**
1-509-940-00	**Receptacle, BNC, female**	**2.09**
1-509-983-00	Receptacle, 2P, female	0.02
1-509-984-00	Receptacle, 3P, female	0.04
1-509-985-00	Receptacle, 4P, female	0.04
1-509-986-00	Receptacle, 5P, female	0.04
1-509-987-00	Receptacle, 6P, female	0.08
1-509-988-00	Receptacle, 8P, female	0.08
1-509-989-00	Receptacle, 10P, female	0.08
1-513-254-00	**Switch, slide**	**0.41**
1-514-524-00	**Switch, slide**	**0.32**
1-515-309-00	**Relay 5V 25mA**	**16.68**
1-516-778-XX	**Switch, slide**	**0.41**
1-516-923-00	**Switch, dip**	**1.77**
1-516-925-21	**Switch, dip**	**3.20**
1-516-994-00	**Switch, lever**	**0.28**
1-517-072-00	**Holder, hours meter and fuse**	**0.04**
1-520-389-00	**Meter**	**2.41**
1-527-227-00	**X'tal, 14.31818MHz**	**5.56**

Parts No.	Description	Unit Price
1-527-245-00	**X'tal, 31.468KHz**	$ **7.87**
1-527-259-00	**X'tal, 31.25KHz**	**7.87**
⚠ **1-532-237-00**	**Fuse, T3.15A**	**0.24**
⚠ **1-532-510-00**	**Fuse, T8A**	**0.24**
1-535-178-00	**Ferrite Beads**	**0.24**
1-541-146-00	**Motor, DC, 3557K009C**	**96.67**
1-541-147-00	**Motor, DC, 3557K020C**	**96.67**
1-548-119-00	**Timer, hours**	**2.41**
1-548-122-00	**Liquid Crystal Display (with FT-3 board)**	**19.46**
1-552-061-00	**Switch, lever**	**0.57**
1-552-102-00	**Switch, digital**	**4.78**
1-552-510-00	**Switch, toggle**	**3.60**
1-552-676-00	**Switch, push**	**3.20**
1-552-677-00	**Switch, push**	**5.56**
1-552-678-00	**Switch, rotary**	**0.81**
1-552-679-00	**Switch, rocker**	**0.97**
1-552-680-00	**Switch, slide**	**0.81**
1-560-130-00	Receptacle, 12P, male	0.81
1-560-131-00	Receptacle, 12P, female	0.97
1-561-040-00	**Receptacle, 14P, female**	**6.33**
1-561-056-00	Receptacle, 12P, female	0.08
1-561-250-00	**Receptacle, 24P, female**	**1.77**
1-561-271-00	Receptacle, 20P, male	1.45
1-588-162-00	Printed Wiring Board, CO-1	0.28
1-588-163-00	Printed Wiring Board, CO-2	0.24
1-588-164-00	Printed Wiring Board, CO-3	0.36
1-588-165-00	Printed Wiring Board, DU-4	1.93
1-588-166-00	Printed Wiring Board, DU-6	1.93
1-588-167-00	Printed Wiring Board, HD-1	2.25
1-588-168-00	Printed Wiring Board, HD-2	0.32
1-588-169-00	Printed Wiring Board, HD-3	0.49
1-588-170-00	Printed Wiring Board, CA-6	1.29
1-588-171-00	Printed Wiring Board, SP-2	2.81
1-588-172-00	Printed Wiring Board, DC-6	0.65
1-588-173-00	Printed Wiring Board, HM-3	0.49
1-588-175-00	Printed Wiring Board, PT-4	0.49
1-588-176-00	Printed Wiring Board, PS-9	0.49
1-588-178-00	Printed Wiring Board, DU-5	0.28
1-588-844-00	Printed Wiring Board, RE-2	0.81
1-800-200-00	**Thermistor, S3K**	**0.08**
1-931-948-00	Flat cable with plugs	9.38
1-931-949-00	Flat cable with plugs	9.38
1-931-950-00	Flat cable with plugs	9.38
1-931-951-00	Flat cable with plugs	9.38
1-931-952-00	Flat cable with plugs	9.38
1-931-953-00	Flat cable with plugs	9.38

Parts No.	Description	Unit Price
1-931-954-00	Flat cable with plugs	$ 9.38
1-931-955-00	Flat cable with plugs	7.87
1-931-956-00	Flat cable with plugs	7.87
2-066-931-00	Nut (B), plate	0.02
2-085-082-00	**Washer, 11.5**	**0.04**
2-251-642-00	**Guard, power switch**	**0.41**
2-252-620-00	**Knob, lever switch**	**0.12**
2-614-004-00	Spring	0.02
2-832-003-00	**Bush, insulating**	**0.02**
3-142-966-00	Spring, tension	0.04
3-148-662-00	**Spring, compression**	**0.24**
3-152-744-00	Cushion, stopper shaft	0.02
3-451-021-01	**Insulator (C), jack**	**0.02**
3-451-107-00	**Spacer, jack insulating**	**0.02**
3-451-128-00	**Sheet, insulating**	**0.02**
3-451-162-00	Washer	0.02
3-491-375-00	Spring, tension	0.02
3-493-871-00	**Spring, compression**	**0.02**
3-530-262-XX	**Spring, tension**	**0.08**
3-531-010-11	Nut, hinge	0.04
3-534-254-00	Roller, cushion	0.02
3-534-255-00	Cushion, brake	0.04
3-534-313-00	Collar	0.02
3-535-338-00	**Spring, compression**	**0.08**
3-536-819-00	Spring, tension	0.28
3-536-849-00	Spring, tension	0.04
3-539-235-00	**Spring, compression**	**0.02**
3-610-023-01	Spring	0.08
3-613-164-00	Shaft, step	0.02
3-618-345-00	Spring	0.04
3-630-364-51	Spring	0.12
3-642-523-00	Spring, compression	0.08
3-643-464-00	Spring, tension	0.08
3-644-026-00	**Nut, plate**	**0.04**
3-646-334-00	Cushion	0.04
3-648-057-00	Nut (ISO-4), U	0.08
3-648-840-00	**Spring, compression**	**0.08**
3-652-612-00	**Cushion (B)**	**0.02**
3-654-058-00	Spacer 3X3	0.02
3-654-513-00	**Leg**	**0.02**
3-654-545-00	Spacer, BNC	0.02

Parts No.	Description	Unit Price
3-654-811-00	**Guide (2), tape**	$ **9.38**
3-656-904-00	Bearing, (P) press	12.36
3-656-905-00	Shaft, (P) press	2.81
3-656-906-00	Lever, (P) press	2.81
3-656-907-00	Support, PR	23.49
3-656-908-00	Lever, PR	6.33
3-656-909-00	**Pinch Roller**	**3.60**
3-656-910-00	Shaft, PR	0.49
3-656-911-00	Retainer, PR shaft	0.08
3-656-912-00	Retainer, spring, PR	0.41
3-656-913-00	**Bearing (RF1340ZZ), ball**	**2.81**
3-656-914-00	Spring, compression	0.08
3-656-917-00	Rod, solenoid	0.73
3-656-918-00	Pin, solenoid	0.28
3-656-919-00	Plate, shield, P.S	0.49
3-656-922-00	Case, shield, H	2.25
3-656-923-00	Insulator, shield case	0.12
3-656-926-00	**Flange (U), GR**	**0.97**
3-656-927-00	**Flange (L), GR**	**1.29**
3-656-928-00	Shaft (2), GR	0.97
3-656-929-01	Roller, guide	1.13
3-656-929-11	Roller, guide	2.09
3-656-930-00	Spring, compression	0.08
3-656-931-00	Spring, compression	0.08
3-656-932-00	**Bearing (LF950ZZ), ball**	**2.81**
3-656-933-00	Retainer, spring, GR	0.28
3-656-934-00	Shaft (1), tape guide	1.29
3-656-935-00	**Retainer, tape guide**	**0.57**
3-656-936-00	**Flange, guide**	**1.29**
3-656-939-01	**Roller, counter (NTSC)**	**7.10**
3-656-939-11	**Roller, counter (PAL/SECAM)**	**7.10**
3-656-940-00	Holder, CR	9.38
3-656-941-00	Pulley, CR	4.78
3-656-942-00	Sleeve, CR	0.49
3-656-943-00	Retainer, CR	0.08
3-656-944-00	Shaft, CR	1.93
3-656-945-00	Retainer, CR spring	0.41
3-656-946-00	**Flange, CR upper**	**2.41**
3-656-947-00	**Flange, CR lower**	**5.56**
3-656-948-00	**Bearing (L1360ZZ), ball**	**2.81**
3-656-949-00	**Pin, tension**	**1.29**
3-656-950-00	Rubber, TA	0.24
3-656-951-00	Plate, shield, H	1.13
3-656-952-00	Table, HS	10.88
3-656-953-00	Shaft, HS	0.36
3-656-954-00	Bracket, HS	0.57
3-656-955-00	Spring	0.16
3-656-959-00	Table, (S) reel motor	0.24
3-656-960-00	**Pulley, (R) motor**	**2.81**

Parts No.	Description	Unit Price
3-656-961-00	Table, (T) reel motor	$ 0.20
3-656-966-00	Ring, retainer	13.82
3-656-967-00	Cam, (S) reel	15.26
3-656-968-00	Ring (A), retainer, spring	1.45
3-656-969-00	Ring (B), retainer, spring	0.20
3-656-970-00	Washer, wave	0.65
3-656-971-00	Screw, retainer, spring	0.28
3-656-972-00	Sheet (A)	0.12
3-656-973-00	Sheet (B)	0.49
3-656-974-00	Sheet (C)	0.16
3-656-975-00	Sheet, reel	0.41
3-656-976-00	Pin, reel	0.41
3-656-977-00	Pin, stopper	0.08
3-656-978-00	Spring	0.08
3-656-979-00	Screw, pin	0.24
3-656-980-00	Plate, detection (36 teeth)	16.68
3-656-981-00	Housing, reel	15.26
3-656-983-00	Retainer (A), bearing	0.73
3-656-984-00	Retainer (B), bearing	0.57
3-656-985-00	Retainer (C), bearing	0.57
3-656-986-00	Retainer (D), bearing	0.20
3-656-987-01	**Spacer (A), 0.5t**	**0.41**
3-656-987-11	**Spacer (A), 0.2t**	**0.41**
3-656-987-21	**Spacer (A), 0.1t**	**0.41**
3-656-988-01	**Spacer (B), 0.5t**	**0.41**
3-656-988-11	**Spacer (B), 0.2t**	**0.41**
3-656-988-21	**Spacer (B), 0.1t**	**0.41**
3-656-989-00	Spring, compression	0.24
3-656-990-00	**Bearing (L-1680ZZ), ball**	**2.81**
3-656-991-00	**Bearing (A-2520), ball**	**2.81**
3-656-996-00	Cam, (T) reel	15.26
3-656-997-00	Retainer, spring	0.16
3-656-998-00	Bracket (A), solenoid	0.16
3-656-999-00	Bracket (B), solenoid	0.16
3-657-801-00	Pin, solenoid	0.49
3-657-802-00	Retainer, spring, TA	0.32
3-657-806-00	Shaft (1), GR	1.13
3-657-809-00	Table (2), GR	5.56
3-657-810-00	**Bearing (LF1280ZZ), ball**	**3.20**
3-657-812-00	Table (3), GR	4.78
3-657-818-00	Boss	0.49
3-657-819-00	Cushion (1), corner	0.73
3-657-820-00	Cushion (2), corner	1.61
3-657-822-00	Bracket, panel	0.20
3-657-823-00	Support, reel panel	0.36
3-657-824-00	Support, POW PC board	0.41
3-657-825-00	Support, battery case	0.36
3-657-826-00	Slant (1)	7.87
3-657-827-00	Slant (2)	7.87

Parts No.	Description	Unit Price
3-657-828-00	**Hinge**	$ **1.45**
3-657-829-00	Guide, band	0.28
3-657-830-00	Support, brake	0.20
3-657-831-00	Lever (A), brake	0.49
3-657-832-00	Plate (A), stopper	0.24
3-657-833-00	Plate (B), stopper	0.24
3-657-834-00	Hook (A), spring	0.16
3-657-835-00	Hook (B), spring	0.16
3-657-836-00	Hook (C), spring	0.24
3-657-837-00	Plate, stopper, solenoid	0.32
3-657-838-00	Absorber, acoustic	0.28
3-657-839-00	**Belt (B)**	**3.20**
3-657-841-01	Spacer (2 dia.)	0.02
3-657-841-11	Spacer (2 dia.)	0.02
3-657-842-01	Spacer (3 dia.)	0.02
3-657-842-11	Spacer (3 dia.)	0.02
3-657-843-00	Support, PC board	0.20
3-657-844-00	Bracket, (D) panel	0.36
3-657-845-00	Bracket, PC board	0.36
3-657-847-00	Cushion, PW	0.04
3-657-848-00	Blind, PW	0.02
3-657-849-00	Cushion, SLE	0.04
3-657-850-00	Blind, SLE	0.08
3-657-852-00	**Plate, ornamental, sub pnael**	**0.24**
3-657-857-00	Heat Sink	0.20
3-657-859-00	Solenoid	0.16
3-657-864-00	Support, DP	0.36
3-657-875-00	Bracket, jack	0.36
3-657-876-00	Bracket, power switch	0.49
3-657-878-00	**Pulley, motor, C**	**2.81**
3-657-879-00	Stopper, head block	0.12
3-657-880-00	Hook, spring, CR	0.20
3-657-881-00	**Belt (A)**	**2.81**
3-657-882-01	**Spacer, EH, 0.02t**	**0.57**
3-657-882-11	**Spacer, EH, 0.05t**	**0.57**
3-657-882-21	**Spacer, EH, 0.1t**	**0.57**
3-657-883-00	Case, shield, C motor	4.00
3-657-884-00	Bracket, sensor	0.81
3-657-887-00	Retainer, bearing	0.16
3-657-888-00	Spacer, preload	0.49
3-657-891-00	Plate, shield, flywheel	4.78
3-657-892-00	Box, jack	1.45
3-657-893-00	**Pulley, T reel**	**19.46**
3-657-895-00	Plate, bottom	0.65
3-657-897-00	Table, S reel	28.59
3-657-898-00	Pulley, S reel	18.08
3-657-899-00	Table, T reel	28.59
3-657-902-00	Plate, shield, aud	4.39
3-657-903-00	Insulator, aud	0.73

Parts No.	Description	Unit Price
3-657-904-00	Case, battery	$ 10.88
3-657-908-00	Shaft (2), tape guide	0.81
3-657-929-00	Arm (A), handle	16.68
3-657-930-00	Arm (B), handle	16.68
3-657-933-00	Pin (B)	0.16
3-657-934-00	Washer	0.81
3-657-936-00	**Handle**	**1.45**
3-657-939-00	**Cover, T guide**	**0.65**
3-657-940-00	**Cover, S guide**	**0.65**
3-657-941-00	Support, guide cover, T	0.65
3-657-942-00	Support, guide cover, S	0.49
3-657-943-00	Washer	0.24
3-657-949-00	Hook	0.28
3-657-950-00	**Plate (1), ornamental, panel**	**0.73**
3-657-951-00	**Plate (2), ornamental, panel**	**0.49**
3-657-953-00	Blind, slide switch	0.02
3-657-958-00	Nut, plate, hinge	0.97
3-657-959-00	Retainer	0.16
3-657-960-00	Insulator, bottom lid	2.25
3-657-961-00	**Lid, bottom**	**166.67**
3-657-962-00	**Lid, battery, case**	**4.78**
3-657-963-00	Hinge	5.56
3-657-964-00	Bracket, lock	0.32
3-657-965-00	**Knob**	**0.12**
3-657-966-00	**Hook**	**0.12**
3-657-967-00	Nut, plate	0.20
3-657-977-00	**Emblem, omega**	**0.36**
3-657-979-00	Mask, switch	0.08
3-657-981-00	Support, R panel	0.57
3-657-982-00	Support, (1), D panel	0.41
3-657-983-00	Support (2), D panel	0.41
3-657-984-00	**Panel, control**	**19.46**
3-657-985-00	**Window, timer**	**2.09**
3-657-986-00	**Guard, REC**	**0.12**
3-657-987-00	**Plate, preset, control**	**0.20**
3-657-988-00	**Boss, preset, control**	**0.16**
3-657-989-00	**Cushion, control**	**0.02**
3-657-990-00	**Knob, select**	**0.16**
3-657-991-00	**Knob, control**	**0.16**
3-657-999-00	**Panel, reel**	**2.09**
3-658-201-01	**Cover, pinch**	**1.61**
3-658-202-00	**Cover, CR**	**1.45**
3-658-203-00	**Panel, drum**	**6.33**
3-658-204-00	**Guard, drum**	**0.41**
3-658-205-00	Mask (1), R	0.12
3-658-206-00	Mask (2), R	0.04
3-658-208-01	**Lid, upper**	**233.33**
3-658-209-00	Seal (1), rubber	0.12
3-658-210-00	Seal (2), rubber	0.12

Parts No.	Description	Unit Price
3-658-211-00	Reinforcement	$ 0.97
3-658-212-00	Nut, plate	0.73
3-658-213-00	Bracket, claw	0.28
3-658-214-00	Packing (1), rubber	2.09
3-658-215-00	Packing (2), rubber	0.97
3-658-216-00	Seal (3), rubber	0.08
3-658-217-00	**Lock**	**1.45**
3-658-218-00	**Window**	**6.33**
3-658-219-00	**Cover, slide**	**7.10**
3-658-220-00	**Sash**	**3.20**
3-658-221-00	**Plate, ornamental**	**0.32**
3-658-222-00	Rail (1)	0.20
3-658-223-00	Rail (2)	0.20
3-658-227-00	Nut (2), plate	0.20
3-658-228-00	Support, HS	0.36
3-658-231-00	Case, shield, C	0.12
3-658-232-00	**Cover, HS**	**0.65**
3-658-235-00	Plate (2), PS shield	0.57
3-658-236-00	Plate (3), PS shield	1.13
3-658-237-00	Insulator, PS	0.08
3-658-239-00	Bracket, damper	0.16
3-658-240-00	**Damper, air**	**20.82**
3-658-247-00	**Cap**	**0.41**
3-658-248-00	Plate, EH shield	0.65
3-658-249-00	Insulator (1), EH	0.08
3-658-250-00	Insulator (2), EH	0.08
3-701-439-11	**Washer, poly 3mm dia (0.25t)**	**0.02**
3-701-441-11	**Washer, poly 4mm dia (0.25t)**	**0.02**
3-701-441-21	**Washer, poly 4mm dia (0.5t)**	**0.02**
3-701-443-21	**Washer, poly 5mm dia (0.5t)**	**0.02**
3-701-444-11	**Washer, poly 6mm dia (0.25t)**	**0.02**
3-701-447-11	**Washer, poly 10mm dia (0.25t)**	**0.02**
3-701-754-00	**Plate, insulating**	**0.02**
3-838-774-00	**Spring, compression**	**0.02**
3-840-411-00	**Nut, push**	**0.02**
3-841-402-00	Spring, compression	0.08
3-844-633-21	**Knob, tone**	**0.04**
3-847-549-00	**Spring, coil**	**0.04**
4-302-090-00	**Hinge**	**0.04**
4-803-120-00	Spring	0.04

Parts No.	Description	Unit Price
8-719-124-07	Diode, RD24E	$ 0.08
8-719-151-07	Diode, RD5.1E	0.08
8-719-156-07	Diode, RD5.6E	0.12
8-719-162-07	Diode, RD6.2E	0.12
8-719-191-07	Diode, RD9.1E	0.12
8-719-200-02	Diode, 10E-2	0.12
8-719-411-02	Diode, ON1102	3.60
8-719-709-25	Diode, 1S1925P	0.28
8-719-815-55	Diode, 1S1555	0.08
8-719-815-80	Diode, 1S1587	0.28
8-719-818-35	Diode, 1S1835	0.28
8-719-931-13	Diode, EQB01-13	0.28
8-719-931-15	Diode, EQB01-15	0.28
8-719-946-70	Diode, HLMP-0301	0.81
8-719-981-04	Diode, ERD81-004	6.33
8-722-383-40	Transistor, 2SK23A-834	0.28
8-723-302-00	Transistor, 2SK43-2	0.32
8-723-304-00	Transistor, 2SK43-4	0.32
8-724-375-01	Transistor, 2SC403C	0.24
8-725-412-00	Transistor, 2SC1124	0.41
8-725-800-00	Transistor, 2SC1128	0.24
8-727-632-00	Transistor, 2SA706	0.65
8-729-113-04	Transistor, 2SK130A	0.73
8-729-171-10	Transistor, 2SA711	2.25
8-729-247-33	Transistor, 2SA473	0.49
8-729-303-52	Transistor, 2SD735-B02	2.41
8-729-347-63	Transistor, 2SD476	0.65
8-729-356-63	Transistor, 2SB566	0.81
8-729-368-90	Transistor, 2SC689H	2.81
8-729-384-48	Transistor, 2SA844	0.12
8-729-468-43	Transistor, 2SA684	0.32
8-729-612-77	Transistor, 2SA1027R	0.16
8-729-663-47	Transistor, 2SC1364	0.12
8-750-340-00	IC, CX-034; SONY	2.41
8-751-300-00	IC, CX-130, SONY	1.45
8-751-310-00	IC, CX-131A; SONY	2.81
8-751-350-00	IC, CX-135; SONY	2.81
8-757-320-00	IC, CX-732; SONY	9.38
8-757-330-00	IC, CX-733; SONY	10.88
8-759-001-16	IC, MC10116L; MOTOROLA	1.93
8-759-040-46	IC, MC14046BCP, C-MOS; MOTOROLA	1.77
8-759-040-70	IC, MC14070BCP, C-MOS; MOTOROLA	0.36
8-759-040-77	IC, MC14077BCP, C-MOS; MOTOROLA	0.36
8-759-041-74	IC, MC14174BCP, C-MOS; MOTOROLA	1.29
8-759-041-75	IC, MC14175BCP, C-MOS; MOTOROLA	3.20
8-759-045-01	IC, MC14501UBCP, C-MOS; MOTOROLA	0.41
8-759-045-03	IC, MC14503BCP, C-MOS; MOTOROLA	2.25
8-759-045-38	IC, MC14538BCP, C-MOS; MOTOROLA	2.41
8-759-045-57	IC, MC14557BCP, C-MOS; MOTOROLA	3.60

Parts No.	Description	Unit Price
8-759-045-72	IC, MC14572BCP, C-MOS; MOTOROLA	$ 0.57
8-759-045-84	IC, MC14584BCP, C-MOS; MOTOROLA	0.73
8-759-100-71	IC, μPC71A (μA710; FSC)	3.60
8-759-103-01	IC, μPC301AC (μA301AT; FSC)	0.57
8-759-114-58	IC, μPC1458C (μA1458TC; FSC)	0.81
8-759-145-19	IC, μPD4519C, C-MOS (MC14519BCP; MOTOROLA)	2.09
8-759-145-57	IC, μPC4557C; NEC	0.57
8-759-240-01	IC, TC4001BP, C-MOS (CD4001BE; RCA)	0.57
8-759-240-02	IC, TC4002BP, C-MOS (CD4002BE; RCA)	0.57
8-759-240-06	IC, TC4006BP, C-MOS (CD4006BE; RCA)	2.81
8-759-240-11	IC, TC4011BP, C-MOS (CD4011BE; RCA)	0.49
8-759-240-13	IC, TC4013BP, C-MOS (CD4013BE; RCA)	1.13
8-759-240-15	IC, TC4015BP, C-MOS (CD4015BE; RCA)	2.81
8-759-240-23	IC, TC4023BP, C-MOS (CD4023BE; RCA)	0.57
8-759-240-25	IC, TC4025BP, C-MOS (CD4025BE; RCA)	0.57
8-759-240-27	IC, TC4027BP, C-MOS (CD4027BE; RCA)	1.13
8-759-240-28	IC, TC4028BP, C-MOS (CD4028BE; RCA)	2.81
8-759-240-30	IC, TC4030BP, C-MOS (CD4030BE; RCA)	1.13
8-759-240-42	IC, TC4042BP, C-MOS (CD4042BE; RCA)	1.45
8-759-240-49	IC TC4049BP, C-MOS (CD4049BE; RCA)	1.29
8-759-240-68	IC, TC4068BP, C-MOS (CD4068BE; RCA)	0.57
8-759-240-69	IC, TC4069UBP, C-MOS (CD4069BE; RCA)	0.57
8-759-240-71	IC, TC4071BP, C-MOS (CD4071BE; RCA)	0.57
8-759-240-81	IC, TC4081BP, C-MOS (CD4081BE; RCA)	0.57
8-759-240-93	IC, TC4093BP, C-MOS (CD4093BE; RCA)	1.93
8-759-245-10	IC, TC4510BP, C-MOS (MC14510BCP; MOTOROLA)	2.09
8-759-245-16	IC, TC4516BP, C-MOS (MC14516BCP; MOTOROLA)	2.81
8-759-245-20	IC, TC4520BP, C-MOS (MC14520BCP; MOTOROLA)	2.81
8-759-245-32	IC, TC4532BP, C-MOS (MC14532BCP; MOTOROLA)	2.09
8-759-245-39	IC, TC4539BP, C-MOS (MC14539BCP; MOTOROLA)	2.81
8-759-245-43	IC, TC4543BP, C-MOS (MC14543BCP; MOTOROLA)	2.81
8-759-245-55	IC, TC4555BP, C-MOS (MC14555BCP; MOTOROLA)	1.45
8-759-618-41	IC, M51841P (NE555N; SIGNETICS)	1.61
8-759-645-15	IC, M54515P; MITSUBISHI	0.97
8-759-900-02	IC, SN74LS02N, TTL; TI	0.49
8-759-900-04	IC, SN74LS04N, TTL; TI	0.57
8-759-900-10	IC, SN74LS10N, TTL; TI	0.49
8-759-900-20	IC, SN74LS20N, TTL; TI	0.49
8-759-900-74	IC, SN74LS74N, TTL; TI	0.73
8-759-901-63	IC, SN74LS163N, TTL; TI	2.09
8-759-901-75	IC, SN74LS175N, TTL; TI	1.61
8-759-901-91	IC, SN74LS191N, TTL; TI	2.25

Parts No.	Description	Unit Price
8-759-902-21	IC, SN74LS221N, TTL; TI	$ 1.93
8-759-902-90	IC, SN74LS290N, TTL; TI	1.45
8-759-902-93	IC, SN74LS293N, TTL; TI	1.45
8-759-903-57	IC, LF357N; NSC	2.09
8-759-904-97	IC, TL497CN; TI	2.81
8-759-905-92	IC, NE592K; SIGNETICS	4.39
8-759-907-49	IC, μA749PC; FSC	4.00
8-759-908-20	IC, TL820CN; TI	1.45
8-759-921-91	IC, TL191CN; TI	4.00
8-759-952-00	IC, EECO5200; EECO	296.67
8-759-970-90	IC, MM74C90N, C-MOS; NSC	1.61
8-759-971-63	IC, MM74C163N, C-MOS; NSC	2.09
8-759-972-21	IC, MM74C221N, C-MOS; NSC	2.09
8-759-978-05	IC, μA78L05ACL; TI	0.73
8-759-980-02	IC, DACIC8BC; DATEL	16.68
8-759-990-82	IC, TL082CP; TI	1.93
8-760-335-10	Transistor, 2SC1474	0.24
8-760-413-10	Transistor, 2SC1475	0.28
8-761-622-00	Transistor, 2SC1636	0.24
8-762-020-00	Transistor, 2SA835	0.81
8-762-110-00	Transistor, 2SC1670-10	0.81
8-765-222-20	Transistor, 2SC1963	0.65
8-765-422-00	Transistor, 2SK152-2	0.41
8-765-600-00	Transistor, 2SC2593	1.29
8-825-717-00	Head, monitor; PF192-5102	96.67
8-829-157-10	Head, audio/CTL R/P; PP77-5104	136.67

Parts No.	Description	Unit Price
PACKING MATERIAL AND ACCESSORY (SUPPLIED)		
1-551-652-00	**Cable with plugs, CCJQ 0.5m**	**$ 26.08**
1-508-172-00	Plug, 10P, female	4.78
1-508-929-00	Plug, 14P, male	12.36
3-658-242-00	Carton, individula	3.20
3-658-243-00	Cushion, lower	2.09
3-658-244-00	Cushion, upper	1.77
3-658-245-00	Spacer	0.28
3-701-633-00	**Bag, poly (for manual)**	**0.04**
3-701-644-00	**Bag, poly (for BVH-500)**	**0.28**
Standard products	Empty reel, R1-9V	—